THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

REPORT

ON

TYPHOID OR ENTERIC FEVER

IN RELATION TO

BRITISH TROOPS IN THE MADRAS COMMAND.

BY

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" Mon bien le plus précieux, c'est la santé du soldat."—TURENNE.

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TYPHOID OR ENTERIC FEVER

IN RELATION TO

BRITISH TROOPS IN THE MADRAS COMMAND.

By Surgeon-General C. A. GORDON, M.D., C.B., &c., &c.

Introductory.—In the course of the inspection tour I had the honor of making during the cold season of 1877-78 with His Excellency the Commander-in-Chief, Madras Presidency, I assumed the task as part of my special duty to inquire into the alleged prevalence of Enteric or Typhoid Fever as a specific pythogenic or filth disease among the British troops in this part of India. At the present time the general question with regard to it stands thus: On the one hand the statement is officially made in the report of the Sanitary Commissioner with the Government of India (for 1870, page 282,) that typhoid fever as it affects British soldiers in India is not a disease new to this country, but that until a very recent date its existence had been overlooked by Army Medical Officers. According to a leading organ of public opinion in England, "The great prevalence of typhoid was long concealed from view behind the forms of fever which were denominated malarious; everything was at one time 'Jungle fever,' whereas it is now perfectly well known that a great part of the so called Jungle fever is neither more nor less than common typhoid." In reference to climatic and other endemic influences in connection with disease incidental to India and other tropical countries, it is further asserted that "beneath this language there lie hid the seeds of many errors, the most serious of which is probably the assumption that there is a fever of the country at all—that is to say, a fever due to climatic influences or to natural emanations from the soil, and not to conditions artificially produced by the inhabitants themselves." On the other hand, it is maintained by writers, whose opinions deservedly carry great weight, that *specific* enteric fever as described by British authors, and in the report by the Sanitary Commissioner, if it exist at all as a disease affecting white troops in this country, does so to a very inconsiderable extent; that the phenomena of the disease so called are results of endemic influences alone; that so far from having been overlooked by the older medical officers, they were perfectly recognized by them and described in their writings. It seems to me that important issues are involved in the question as thus stated; that not only are points of professional and scientific interest concerned, more particularly the correct treatment of sick soldiers; but that it includes also considerations connected with general sanitation and finance. It has accordingly appeared to me suitable that as one of the few remaining Army Medical Officers of protracted experience in India, I should, before withdrawing, enter as fully as in my power upon the consideration of this matter, communicating my views thereon in this shape for the information of His Excellency, and for that of His Grace the Governor in Council. In entering upon the investigation therefore it seems to me desirable, in the first instance, that we should have as clear an understanding as possible with regard to the actual conditions held by recognized authorities to constitute the specific disease so called. In the following remarks, I summarize the views of some of those authorities with the object as it were, to obtain a standard of comparison; and having done so, I then proceed to ascertain how far the cases said to be of enteric fever occurring among British Troops in Madras and Burmah harmonize with the

Enteric Fever overlooked.

Climatic fever.

Views of older medical officers.

Importance of the question involved.

A standard of comparison.

descriptions so given. The details are doubtless somewhat technical, nevertheless, the subject is, I believe, of sufficient importance to justify me in soliciting attention to them.

Generated by decomposing organic matter.

2. *Definition.*—Dr. Murchison describes typhoid fever as an endemic disease, generated and propagated by certain forms of decomposing organic matter. The disease thus induced is always localized in the solitary and agminated glands of the ileum, producing enlargement and ulceration in them. In Britain it often appears in country places, and in the best aired houses, in such instances being for the most part due to sewage air or water. Its period of incubation is about ten days; never less, but often more.

Sewer emanations.

The increase in the prevalence of enteric fever in London has been contemporaneous with the main drainage scheme. In Edinburgh its occurrence followed the introduction of the new sanitary arrangements; the substitution for the scavenger and night man, of drains opening into the interior of houses, but with water-supply insufficient to prevent the escape of sewer emanations. Throughout the reports by the Medical Department of the Privy Council and Local Government Board, the affection is described as pre-eminently a disease produced by filth. In Rugby, Chelmsford, Penzance, and Worthing it occurred in connection with emanations from sewers. In Croydon it arose from a similar source, its rate of prevalence decreasing as a system of ventilation of the town sewers extended. Dr. Murchison believes that when cases of this disease occur in a hospital, either the air or drinking water is polluted with decomposing excrement; further, that fever arising from air and drinking water polluted with sewage and other forms of putrefying animal matter is always enteric fever. According to Dr. Aitken, the definition of typhoid fever is—A continued fever, associated with eruption, appearing from the 8th to 12th day, occurring in crops, each crop continuing visible about three days; languor and weakness from the first; headache, abdominal pains, diarrhœa; evacuations alkaline, containing much soluble salts; death in fatal cases about the end of third to that of the fourth week; average duration of the fever about 23 days; enlargement of mesenteric glands; deposit in glands of Peyer and minute solitary glands of the small intestine. The disease having once occurred the patient is protected from a second attack.

Air or water polluted.

General phenomena of attack.

Relation to other diarrhœal affections.

According to Dr. Budd of Bristol, typhoid fever is in its nature very intimately related to other diarrhœal affections. Sir R. Christison observes that this disease, variously called dothen-enteritis, entero-mesenteric fever, enteric typhus, typhoid, and enteric fever is the most deadly of all continued fevers.

Historical notices.

It was first distinguished from other forms of fever in Germany in 1762, was first described in France in 1812, and first diagnosed in London in 1827. According to Dr. Strange of Worcester, enteric fever has certain resemblances to the pure exanthemata, but with differences which are specific, if not generic. Sir W. Jenner draws a similar analogy between them; both he and Sir T. Watson look upon the characteristic affection of the bowel as being the specific eruption of a contagious fever. Dr. W. B. Baikie, as a result of experience in the Royal Naval Hospital, Haslar, considers that typhoid fever or dothen-enterite does not present the characters of a true fever at all. In it the intestinal lesion seems to be the primary disease.

Relation to the exanthemata.

Pulse. Skin. Febrile symptoms. Tongue. Temperature. Tympanitis.

3. *Symptoms.*—Often insidious; slight rigors; chilliness; pulse small, more rapid in the advanced stages than in the early, 100 to 120, accelerated in the evening, may fall in the morning to 90, subject to great variations; skin warm, dry, or alternating between clamminess and perspiration. The febrile symptoms are remittent or intermittent; the tongue is red and fissured transversely; in some instances clean, smooth, and glazed. Temperature of the axilla in the evening 103 F. or 104 F. There is splenic dullness; tympanitis generally, but not invariably. The

Tenderness and iliac gurgling.

latter symptom occurs in all forms of continued fever, as also in remittents; it is therefore not peculiar to typhoid. Abdominal tenderness is common, but not necessary. There is gurgling in the right iliac fossa. Diarrhœa is the rule, constipation the exception. Diarrhœa may be accompanied by hæmorrhage, or not, and hæmorrhage may occur without diarrhœa. Hæmorrhage is rarer in children than in the adult; it occurred in 7 out of 21 fatal cases. It usually sets in after the second week. It may or may not be dangerous. In London intestinal hæmorrhage in typhoid fever is common; it is rarer in Paris and in Dublin. Hæmorrhage may occur in other forms as epistaxis, hæmoptysis, purpura, &c. Often there are no enteric symptoms, so that intestinal lesions are overlooked until they become a source of danger; nor is there a correspondence between the severity of the febrile symptoms and the extent of intestinal lesion. Occasional perspirations occur. The eruption when present, appears on the seventh day. There is headache, stupor, delirium, but at times the mind is clear. When delirium occurs, it is greatest at night. The pupils are dilated. The urine is scanty, dense; after the second week its quantity increases and it becomes less dense. Its specific gravity varies from 1,003 to 1,038. Albumen is less frequent than in cases of typhus. The greater the excretion of urea the better; if 500 to 700 grains in man, or 300 to 500 in woman are passed in 24 hours, the progress is so far favorable. The existence of slight albuminuria or hæmaturia is not of itself unfavorable. Respiration is quickened; the breath is offensive, and has been found to contain ammonia. Thirst sometimes excessive. In the outbreak at Clapham the attack was ushered in by vomiting and purging; delirium occurred on the first or second day. In the outbreak at Peebles the absence of diarrhœa and abdominal tenderness was not incompatible with enteric fever. The evacuations are liquid, ochre yellow; their odor very offensive and often ammoniacal; reaction alkaline, due to carbonate of ammonia and a fixed alkali. According to Dr. Johnson, the former prevalence of diarrhœa arose from the use of irritating remedies; at King's College Hospital this symptom was found of late much rarer than it formerly was, as a result of the milder system of treatment pursued. According to Dr. Harley there is present a continued febrile condition of uncertain duration; intestinal derangement; in the early period more or less pyrexia; when fully developed there is hectic fever; a scattered rash in successive crops on the abdomen and chest.

Diarrhœa and hæmorrhage.

Epistaxis, purpura, &c.

Eruption.

Delirium.

Urine.

Excretions.

4. *Characteristic Eruption.*—Dr. Murchison describes the eruption peculiar to enteric fever thus: It consists of isolated, elevated rose colored spots, at first not easily discernible, vanishing on pressure; the spots measure from half a line to two lines in diameter; their margin is well defined; they are never connected with petechiæ; they are usually first found on the abdomen and chest, especially on the sides of the abdomen; in women, a usual position is the breast. They first appear between the 7th and 14th days in successive crops, each crop lasting two or more days; in some cases recurring with other symptoms after 24 or 30 days. They are never observed on the dead body.

Rose colored spots.

Petechiæ.

That of typhus is petechial from the first appearance, or becomes so within a couple of days, being, it is said, in some instances difficult at first to distinguish from that of enteric. Nothing can be more unlike than the developed eruptions of the two diseases. The characteristic eruption of typhoid appears on the chest, abdomen, and back; it consists of isolated, small, circular, well defined, rose colored spots, disappearing on pressure and returning when the pressure is removed. Their number varies from three or four to many hundreds, but in most cases does not exceed twenty or thirty at a time. But the eruption is not invariably present. Chomel found it so in only 16 out of 70 cases. In Paris it is for the most part always found, while at Touraine it was entirely wanting in different epidemics. Trousseau, while disagreeing with those who hold that these spots constitute the specially characteristic eruption of dothen-

Typhus eruption.

Rose spots not always present.

Not essential although important.

enterite, yet considers them of very great importance in the symptomatology of the disease. In the cases at Deesa in 1859, reported by Dr. Hanbury, no rose colored or specific lenticular eruption was observed; the cases occurred however, at the season when prickly heat prevailed. The rash is more frequently absent in persons over 30 and under 10 years of age than in those between 10 and 30. There is no relation as in typhus, between the abundance of the eruption and the severity of the disease. Dr. Harley observes that these spots are seen occasionally on the face and upper and lower extremities.

Difference of opinion.

According to some writers this eruption is found in no other disease except enteric fever; according to others, rose spots occasionally appear in other acute diseases; of this, examples are related in connection with purely malarial fevers in America. They may precede typhus rash, and disappear when petechiæ occur. Dr. Aitken writes: The successive daily eruption of a few small, very slightly elevated rose colored spots, disappearing on pressure, each spot continuing visible for three or four days only, is peculiar to, and absolutely diagnostic of typhoid fever. A delicate scarlet tint of the skin, as if after having a bath, sometimes precedes by a day or two the characteristic eruption of typhoid fever. Its occurrence has been noted by Drs. Stokes and Aitken. The papulæ, according to the latter, never present a well defined margin; they disappear on pressure, reappearing as it is removed. It is the appearance of this eruption which clenches the diagnosis, and which becomes absolute as regards typhoid fever, when, in a febrile disease attended by diarrhœa, rose spots appear on the sixth or eighth day. Dr. Joseph Bell of Glasgow observes that the eruption of scattered rose spots occasionally becomes mulberry in color, and extensively diffused. He has seen in a well marked attack of typhoid fever, after severe epistaxis, that the rose colored elevated spots have been converted into non-elevated maculæ, at the same time that a large additional number made their appearance. According to Dr. Kennedy of Dublin, when a whole family is attacked, some members may exhibit spots and others not. Two crops of eruption are not uncommon in the typhus of Dublin, and either may precede the other. One of these may be bright red, the other of a much darker hue, and they often coexist. Petechiæ may exist with typhoid fever, and bright lenticular spots whithout this fever. Bright lenticular spots may be followed by petechiæ. Dr. Fuller alludes to the eruption of typhoid as a mulberry rash; Dr. Todd describes it as petechial.

Noticed in India.

From these particulars we perceive, that the descriptions given by different authors in regard to the so called characteristic eruption vary considerably among themselves. As elsewhere more particularly described, the presence of an eruption in certain forms of fever in India was noticed and described by Dr. Morehead, namely, in cases of adynamic remittent, and in those of the malignant form of that disease.

Taches bleuatres.

But in addition to the eruption here described, the presence in greater or less profuseness on the surface of the body of bluish colored patches, *taches bleuatres*, has been observed. These patches are of an irregular rounded form, and from three to eight lines in diameter; they are not elevated; they are of uniform tint, sometimes confluent; they never pass through the stages observed in the spots of typhus. They are most common on the back, abdomen, and thighs. The cases in which they occurred have usually been mild.

According to Dr. Handfield Jones, in the algide fevers caused by malaria the skin is sometimes of natural color, sometimes livid, or covered with livid spots. According to other authors *taches bleuatres* occur in other diseases than enteric fever. Thus their occurrence or otherwise cannot be considered essential as a character of that affection. Dr. Todd alludes to the presence of *miliaria* or *sudamina* in certain cases of enteric fever with great sweating. Trousseau observes that *la miliare pellucide*, improperly called sudamina, generally appears between the eleventh and twentieth day, sometimes later; it consists of small blebs like tears, filled with transparent fluid. It usually exists on the abdomen, groins, front of the neck, and of the axilla, and is only recognisable when near the patient, and by the rugosity to the touch.

Miliaria.

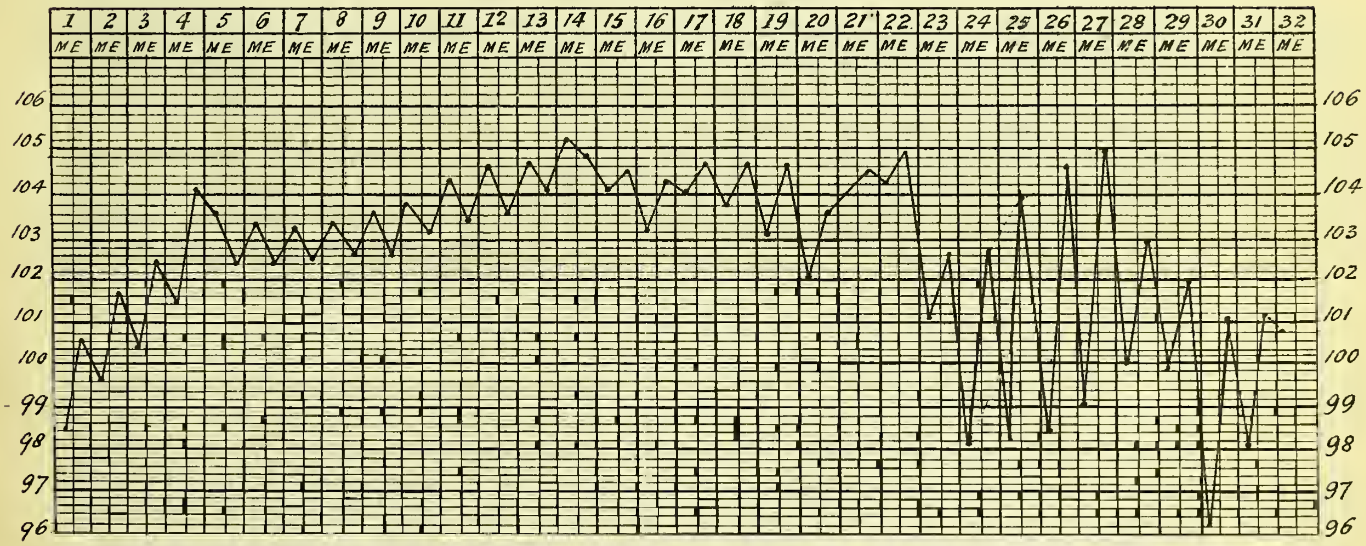
Its character.

5. *Temperature.*—The range of temperature in cases of enteric fever belongs to the interrupted variety, that is, it rises and falls frequently. It may have frequent and extensive daily fluctuations, the highest reading being generally, but not always in the evening. In the axilla it may be considerable, although at the same time that of the extremities is below the natural standard, and the patient even suffer from chilliness and have "goose skin." According to Dr. Murchison the temperature is remittent, having morning remissions and evening exacerbations; it begins to rise about noon, is at its maximum from 7 P.M. till midnight, then begins to fall till 6 or 8 A.M., when the remission is greatest. The maximum evening temperature is usually reached between the fourth and sixth day, and is usually 104 F. to 106 F. The rise of temperature in the early period of the disease is usually in a gradual zig-zag fashion. Before death it may reach 108 F. or 110 F.; in collapse it may sink to, or below the normal standard. Recovery is rare after a morning temperature rises to 104 F., or persists at 103 F., or when the evening temperature continuously exceeds 105 F., or is at any time 107 F. When the temperature becomes normal on two successive evenings convalescence is indicated. According to Dr. Latham typhoid fever is not present (*a*) if, on the second or third morning, the skin temperature approximates the normal (98·6 F.); (*b*) if, during the first two days, it rises to 104 F.; (*c*) if, between the fourth and sixth, in a person of medium age, it does not reach 103 F.; (*d*) if, on two of the first three evenings, it is the same.

The following typical chart is from Dr. Murchison's work on continued fevers, the case in which the observations were made "aborting" at the end of the second week.

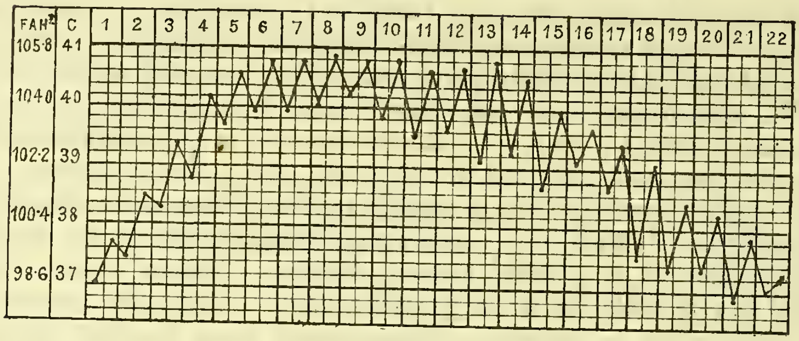
No. 3.

Typical Chart from Aitken No. 3.



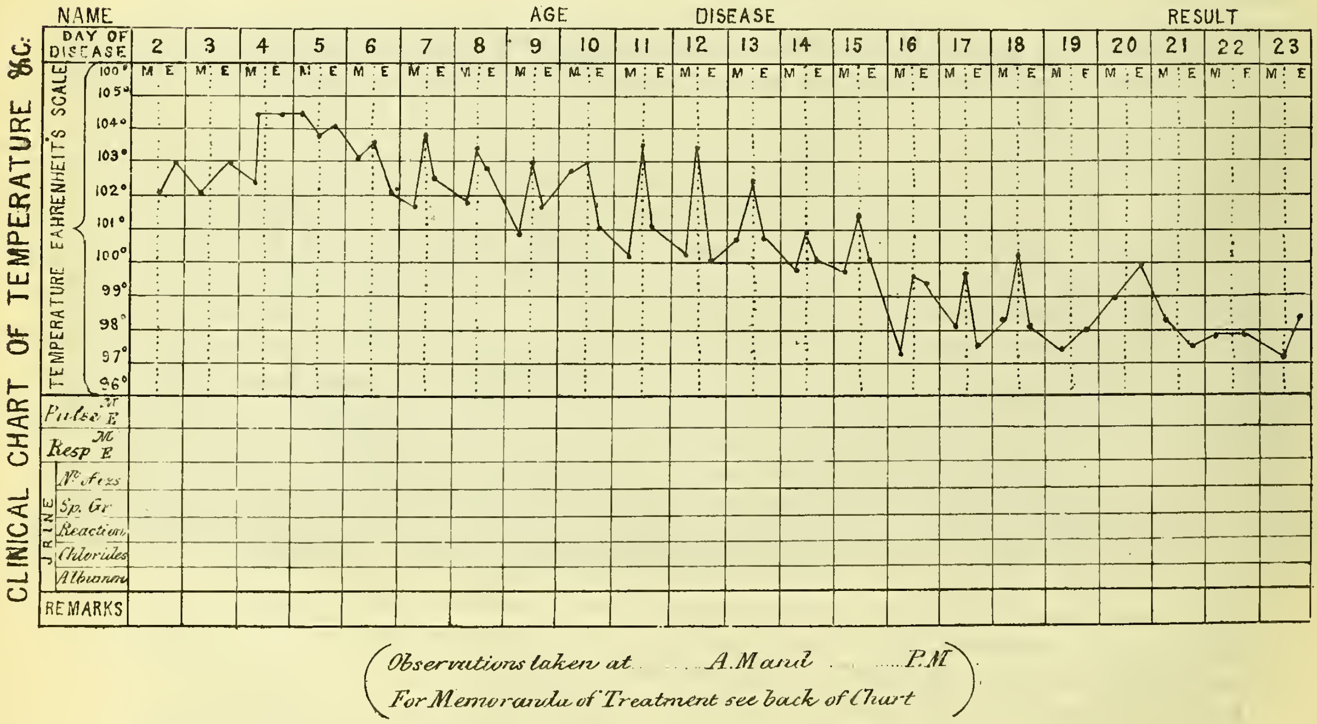
The next from Wunderlich represents the temperature curve in a mild case of the same disease.

TYPICAL CHART OF A CASE OF REGULAR MILD ENTERIC FEVER FROM (WUNDERLICH)



The following particulars are extracted from the article on enteric fever in Dr. Aitken's work on Medicine. Temperature, 1st day, morning 98·5, evening 100·5; 2nd morning 99·5, evening 101·5; 3rd morning 100·5, evening 102·5; 4th morning 101·5, evening 104·0. In the second half of the week the evening temperature is from 103 to 104, the morning temperature a degree lower; on the third or fourth day the height of the fever is attained, the evening temperature is at least 103·5; from that onwards the fever proceeds in regular stages of weekly and half weekly periods. A permanent temperature of 104 F. is an unfavorable sign. For weeks the evening temperature may be 104 F. or more, whilst in the morning the patient is free from fever. The approach of death is indicated by a permanent or persistent elevation of temperature in the morning to 106 F., by a sudden rise to 108 F., and more seldom by a fall below 98. The subjoined typical chart is also copied from the work of Dr. Aitken, he having adopted it from Wunderlich.

TYPICAL TEMPERATURE CHART IN A CASE OF ENTERIC FEVER (FROM DR. MURCHISON)



In remittent fever. With regard to the remittent fever of India Dr. Morehead observes that there are cases in which the exacerbation comes on about noon, and declines about midnight; the remission continues during the night and till noon the following day, when the exacerbation again recurs; in other

cases the exacerbation comes on about midnight and continues till morning; a third set in which the exacerbations recur at noon and midnight, the remissions most distinct in the morning; and a fourth in which the exacerbations occur at different hours on different days. In all however, the morning is the period when we are most certain of finding a remission. In other instances the fever becomes almost continued. From these particulars therefore two important circumstances are apparent, namely, that the typical charts given differ from each other in a very material degree, and secondly, that while in some respects observations taken in India coincide with the general characters of each, in others they differ materially. At any rate, the circumstance is clear that the indications here alluded to were not overlooked.

The standards given differ.

Not overlooked in India.

6. *In relation to age.*—Dr. Murchison points out that the age of greatest liability to enteric fever is from 15 to 25; the next from 25 to 30, after which this susceptibility decreases. A case is recorded in which an infant died by the disease on the eighth day of its life. It must have therefore contracted the affection in the mother's womb, although the mother had not the fever, either during pregnancy or after delivery. Manzini describes a fatal case in which lesions of enteric fever occurred in a seven months' child which died half an hour after birth. The mother was not ill. Of 7,348 cases reported to the French Academy 31 per cent. of the patients were under 15 years of age. According to Dr. Aitken it is necessary to observe in connection with the age of typhoid fever patients, that the solitary and agminated glands are most fully developed, and most active in youth up to the age of early manhood, after which they begin to disappear; after forty or forty-five years traces only of their existence are apparent. Cases of typhoid fever are however recorded by M. M. Trousseau, Lombard and Françonnet in persons of 55 and in those of 60 to 75. Dr. Paget noticing the comparative immunity of infants and persons above 40 years of age from typhoid fever with rose spots and affections of Peyer's glands, observes that the circumstance indicates that the constitution of the individual is an element in the question. According to Dr. Morehead, of 50 cases of remittent fever ending fatally at Bombay, the subjects were between 10 and 15 years of age in two instances, 16 to 20 in four, and 21 to 25 in fourteen. In India the relation of endemic disease to age corresponds pretty closely to that of typhoid fever in Europe; the greatest rate of mortality from fevers generally taking place among young and recently arrived soldiers. It is so in tropical countries generally, and the circumstance is important in its military bearings. How far however, the greater rate of mortality of soldiers in this command and throughout India, is caused by specific enteric fever instead of by non-specific climatorial diseases has now become an important point to ascertain.

In the unborn infant.

In old age.

Indian fevers.

7. *In relation to Sex.*—Of 1,620 cases under 30 years of age, the females exceeded the males by 32; of 252 cases over 30, the males exceeded the females by 16. Dr. Ballard observes that in his experience 97 females above ten years of age had enteric fever to 44 males. He observes that, as a rule, women drink more milk than men, and hence the greater liability of the former to the disease. According to the experience of the London Fever Hospital, the disease is much more frequent in boys than in girls. In army statistics in India, the occurrence of what is called enteric fever, and indeed, of endemic fever among the wives and daughters of soldiers is comparatively rare.

Different opinions.

8. *In relation to Season.*—Of 131 cases treated in London 21 occurred in spring, 25 in summer, 51 in autumn, 134 in winter. Thirty-five years ago there was no evidence of intestinal disease in the continued fevers of London, except in autumn. Most of the outbreaks in English towns and villages during the last thirty years have occurred in autumn. According to Dr. Murchison, enteric fever usually prevails after seasons remarkable for dryness and high temperature. Many instances are recorded of the prevalence of the disease after prolonged hot and dry weather; also in warm, damp weather, when drains are most offensive. According to Dr. Harley, the absence of rain furnishes conditions most favorable to the increase of enteric fever. The

Autumn.

autumnal fever of last century in Britain and Ireland was apparently the same disease as that to which the name enteric fever is now applied. Of 452 cases recorded in France 316 occurred in autumn and winter, 54 in spring. Of 645 cases in America 250 were in autumn and 104 in spring. In India, in most of the instances brought to notice the cases occurred either in the cold or rainy season; but this subject is more fully entered into in paragraphs 17 and 18 of these remarks; suffice it therefore to observe in this place that each season has its particular form of climatorial fever, and that each form is liable to vary in the course of its progress. As a general rule, the most severe cases of fever and of dysentery, especially among the newly-arrived in India take place at the beginning and end of the rainy season.

In India.

9. *In relation to residence in a particular locality.*—Medical students were most liable to be attacked within a few weeks of their arrival in Paris. Foreigners, on coming to Paris, are soon attacked by it; similar observations apply to London. It is considered that constant exposure thereto fortifies the system against the action of the poison of enteric fever. Dr. Morehead records cases of the severer form of remittent of India in newly arrived soldiers and sailors, the appearances after death being identical with those now considered distinctive of enteric fever; as recent arrival in India and youth are usually coincident in the same individual, they thus exert their double influence as predisposing and exciting causes of climatorial diseases. To these conditions must also be added inexperience and indiscretion, leading to acts of exposure to causes of diseases that are avoided by the older residents.

In regard to Paris and London.

India.

10. *Contagious or not?*—The conclusion arrived at in France is that enteric fever is contagious, but only under certain conditions. In England opinion is divided on the subject. Many instances are on record of several cases occurring in the same house without any traceable importation of the poison. It is rare for hospital attendants to contract enteric fever from patients. Out of 3,555 cases of enteric fever treated along with 5,144 patients not suffering from any specific fever in a space of nine years, not a case of the latter contracted the former. Persons laboring under enteric fever are, on the other hand, said to occasionally transport it into localities where it was before unknown, but where it spreads from them as from a centre. Visiting or contact with the sick is not necessary, or sufficient to propagate the disease. The alvine dejections are the principal, if not only medium of communication. These become dangerous during decomposition, and find their way into water or milk. Dr. Harley observes that the form of disease named by him paludal enteric fever is non-contagious. According to Dr. Budd of Bristol typhoid fever is essentially contagious. Dr. Grimshaw of Dublin believes that it may be spread by contagion, derivable from the alvine dejections of infected persons. Dr. Aitken mentions that at La Frèche in France, of 29 cases, 8 communicated the disease to attendants. At North Tawton it was also considered to have been communicated. Dr. Morehead observes that in India the belief that malarious fevers are liable, under certain circumstances, to be spread by infection is of old standing. Dr. Fordyce held these views, and Clarke and Lind believed that the Bengal remittent fever was at times infectious. Dr. Balfour considers intermittent, as well as the more violent continued fever with dysentery as so many grades of intestinal remitting fever, all of which he pronounces to be infectious. Dr. Morehead, under the head of adynamic remittent fever, infectious in character, described a disease that from 1815 to 1820 prevailed in Kattywar, Kutch, and parts of Guzerat, and subsequently in various places under the name of the Pali Plague or Mahamurree, it being confined to natives. His impression was that this was a fever of endemic origin, assuming infectious properties, originating from filth, crowding and imperfect ventilation. These particulars therefore point to the conclusion that a form of fever primarily induced by paludal or climatorial influences may, under certain circumstances, propagate itself from the affected to those otherwise non-affected.

France.

England.

In hospitals.

Dejections the vehicle.

Different opinions.

Malarial remittent fever.

11. *Duration of attack.*—According to Dr. Murchison the usual duration of enteric fever is from three to four weeks. Of a series of cases of the disease, its period of continuance was 12 days in one case, 14 to 21 in 19; 22 to 28 in 40; 29 to 30 in 9; above 30 in 6. In the outbreak at Clapham some cases were fatal in less than four days. Gradual improvement may take place in the end of the third or fourth week of the disease, the first sign of improvement being a more decided remission of the symptoms. Convalescence is tedious, and liable to interruptions; thus an outbreak may extend over 2 or 3 months. The points here noted are important in respect to what has been observed in cases occurring in Regimental Hospitals in this Command, and recorded as enteric fever. We shall see that in many cases of endemic fever in which recovery took place, the progress was very slow indeed.

The period varies.

12. *Diagnosis.*—According to Dr. Murchison, enteric fever prevails most among the upper classes and those in easy circumstances; typhus fever in the lower and poorer classes. While typhus is acknowledged to be infectious, there are doubts as to enteric fever being so. There is no distinctive odor in cases of enteric fever; there is in those of typhus. Typhus will be also distinguished by its more sudden onset, less remittent character of pyrexia, shorter duration, terminating by crisis rather than by lysis. Dr. Kennedy looks upon typhus and typhoid fevers as but different types of the same disease, and in his views has the support of several Dublin physicians. Dr. Tweedie is an advocate for their entire distinctness. From *remittent fever* diagnosis is acknowledged to be very difficult in countries where both prevail. The pyrexia of enteric fever is essentially remittent, and in the malarious varieties it has put on at first an intermittent type. The close resemblance of enteric to remittent fever accounts, so it is stated by some very modern writers, for the fact that it is only within the last few years that the former malady has been recognised as occurring in India. According to other writers, our conclusions must rest more upon negative than positive evidence. *From dysentery* cases are related in which diagnosis was difficult. Dr. Harley observes that the indications of inflammation and ulceration of Peyer's patches are pain in right iliac fossa, persistent diarrhœa, light-coloured watery evacuations, hectic fever, eruption of rose-coloured papules. Here it is evident that the conditions of Peyer's patches recorded by him, are looked upon as in reality enteric fever itself. Dr. Joseph Bell of Glasgow, as the result of his own observations, is forced to the conclusion that disease of the mucous membrane of the small intestines constitutes the anatomical plesion in typhus as well as in typhoid fever; consequently the two diseases are identical in this essential lesion. Sir W. Jenner in four years never saw a single exception to the rule that rose spots are diagnostic of typhoid fever, that is to say, of an affection having for its anatomical character, disease of Peyer's patches. Thus differences of opinion exist in regard to some at least of the diagnostic signs of typhoid fever. The indications of that disease are difficult to distinguish from those of remittent fever and from dysentery; the spots are not *essential* in all cases, nor is the particular condition of Peyer's glands peculiar to enteric fever. But more about this matter in the next paragraph.

Typhus.

Remittent fever.

Dysentery.

13. *Post-mortem appearances.*—Dr. Murchison enumerates as follows the post-mortem appearances characteristic of enteric fever. Disease of the solitary and aggregated glands of the ileum, enlargement of the spleen, and mesenteric glands. The lesions of Peyer's patches and of the mesenteric glands invariably present in enteric are absent in typhus. In the outbreak at Clapham, Peyer's patches and the glands of the large intestines were enlarged like condylomatous elevations; in one case the mucous membrane over them was slightly ulcerated, the mesenteric glands were enlarged and congested. Perforation of the bowel is found in nearly one-fifth of fatal cases; it is more common in males than in females and rare in children. In two cases given, perforation occurred 12 inches from the ileo-colic valve; the peritoneum at that point sloughed; the ulcer was covered with fragments of sloughs and clots, some of Peyer's patches and many solitary glands above this ulcerated; some solitary glands enlarged;

Glands of the ileum.

Perforation.

Colon.

many solitary glands in the cæcum and ascending colon ulcerated or contained morbid deposit; large intestine contained a few ounces of blood, mesenteric glands enlarged.

1st stage.

In the 1st stage Peyer's patches are indurated and raised, the mucous membrane over them grey purplish, softened, peritoneum corresponding much infected; they may be soft or hard. The solitary glands at the lower end of the ileum are often affected, as are Peyer's patches; they were found diseased in 12 out of 46 cases; their appearance may be that of pustules of small-pox.

2nd stage.

In the 2nd stage ulceration of Peyer's patches may begin in two ways; by softening or by sloughing. In the latter case the sloughs are yellowish brown, spongy, infiltrated with bile or with blood.

3rd stage.

In the 3rd stage these ulcers have their seat in the lower third of the small intestine, their number and size increase towards the ileo-cœcal valve. Close to the cæcum, ulcers may unite so as to form a mass several inches in length; their form is elliptical, circular, or irregular. The elliptical ulcers do not form a zone encircling the intestine as with the tubercular ulcer, but their long diameter corresponds to its longitudinal axis. An elongated ulcer running transversely may result from a union of several small ones.

4th stage.

In the 4th stage cicatrization takes place. When perforation takes place the opening is always round; one or two openings of this kind may be seen at the base of an ulcer.

Peculiar to enteric fever.

The number of diseased Peyer's patches may vary from two or three to forty; at the upper part of the ileum the transition between the diseased and healthy patches is usually rather abrupt; the diseased process is always further advanced the lower we go; an extensive mass of disease is usually found at the lower end of the ileum terminating abruptly at the valve. These appearances, presented by the solitary glands and Peyer's patches are constant in, and peculiar to, enteric fever.

Colon and cæcum.

The solitary glands of the colon are enlarged or ulcerated like those of the ileum in one-third the cases that prove fatal. The disease may be confined to the cæcum and ascending colon, or may reach to the sigmoid flexure; the ulcers are usually round and small; they may be an inch and a half long, and then their diameter is transverse. Other authors observe, however, that in exceptional cases the disease is more extensive in the large intestine than in the small, and a case is recorded in which it was restricted to the large bowel.

Lesions of dysentery.

The lesions of dysentery occasionally co-exist with those of enteric fever. The mesenteric glands are generally enlarged. The spleen is almost always hypertrophied.

Typhus and typhoid.

Dr. Harley considers that the distinction between the typhous processes and the dysenteric in the large intestine is purely artificial. In a case related the large intestine was the more extensively ulcerated, and the ulcers in both small and large intestine were undistinguishable from dysenteric ulcers.

Cholera.

A protracted attack of cholera bears a close resemblance to enteric fever, and the intestinal lesions of the two diseases are undistinguishable from each other.

Mineral and vegetable substances.

There are both mineral and vegetable substances which when introduced into the stomach produce symptoms and morbid changes which, if not identical with those of enteric fever, are at least hard to distinguish from them; poisonous mushrooms produce such effects, so do colchicum and cicuta virosa.

In several diseases.

There can be little doubt that the usual symptoms and *post-mortem* appearances of enteric fever may arise during the progress of several other acute diseases, as a consequence of a general inflammatory condition. According to Dr. Twining eliptical ulcers are always opposite to the attachment of the mesentery, in fatal cases of endemic remittent fever. Dr. Joseph Bell observes that in the epidemics of typhus described by M. Réveille Paresse the glands of Peyer were found inflamed.

Various opinions.

Forget and Cruvellhier found the same conditions constantly present in the epidemic of typhus in 1814. Dr. Bell quotes various other authorities to the same effect; and with reference thereto observes, that in typhus, the same conditions of Peyer's glands

exist as that found in typhoid. Dr. O'Brien found the small intestine ulcerated in two-thirds of fatal cases of dysentery. Dr. Gairdner of Edinburgh observes in reference to ulceration of the Peyerian patches that it is by far the most noteworthy single fact, pathologically speaking, in the natural history of enteric fever, yet it will not do on a fact like this to found in the matter of diagnosis; after you have settled that there are cases of fever with ulcerated intestines, you have still to settle whether these cases are different in nature from other cases, in many respects similar, in which the intestines are not ulcerated.

Remittent fever in India.

Dr. Morehead makes frequent allusion to the occurrence in cases of remittent fever in India of appearances after death such as have been held to be peculiar to those of enteric fever. In Case No. 36 recorded in his work on the diseases of India the aggregated glands of Peyer were enlarged, the mucous coat of the colon of a dark grey color, and studded throughout with dark points,—enlarged follicles. In Case 39, at the end of the ileum the isolated glands were prominent, the mucous coat of the colon of a leaden grey tint. In Case 43, close to the ileo colic valve there was an ulcerated patch the size of a rupee; the patches of Peyer's glands were red, turgid, and several of them in various stages of ulceration. There was dark red color of the mucous coat of the cæcum, but no ulceration. In Case 45 there was much vascularity of the mucous coat at the lower end of the ileum; in the descending colon and rectum patches of effused lymph (in the sub-mucous tissue). In Case 46 the glands of Peyer were distinct, and there were three or four round ulcers, each the size of a split pea. In the colon the follicles were distinct but the tunic healthy. The mesenteric glands ranged in size from a pea to a horse bean, but were not tubercular. Dr. Twining observed that in those who die of dysentery the last three or four inches of the ileum adjoining the cæcum are generally affected with superficial ulceration and roughness. In the dysenteric termination of protracted fevers ulceration of the small intestine frequently exists. Dr. Morehead quotes a case described by Dr. Johnston in which a young man of good constitution had been assisting with others to navigate an Indiaman along the Hoogly; he became attacked with remittent fever and died; after death marks of incipient inflammation were visible in some parts of the small intestines, and the internal surface of the stomach exhibited similar appearances. Sir James Annesley in his great work describes inflammation and ulceration of Peyer's glands as occurring in cases of ordinary climatorial fevers of India, and in enteritis. Some Indian writers of the present day, notwithstanding the investigations of their predecessors, appear to consider the existence of such appearance as of itself sufficient evidence of the existence of enteric fever, whatever may have been the symptoms during life. In these remarks then, we find one set of authors definitely asserting that certain morbid appearances are invariably present in, and distinctive of enteric fever; other writers stating that similar appearances not only occur in diseases other than enteric fever, but as results of poisons, mineral and animal; while the fact is rendered apparent by observations already quoted that similar lesions have frequently been observed in fatal cases of Indian climatorial fevers of non-specific character.

Quinine.

14. *Treatment.*—Dr. Murchison writes on this subject that in cases where the disease puts on a remittent type, quinine may be given with advantage. The effects of quinine are favorable in the enteric fever of children which is so often remittent. Dr. Harley remarks that if the disease exhibit an intermittent character quinine may be given every evening. Dr. Morehead observes of the remittent fever of India of an adynamic form, that all that can be done is to reduce temperature by tepid sponging, to sustain the pulse by light nourishment, wine, and other stimulants; small blisters over the organs that seem to be chiefly affected. Quoting from Mr. Hare he says that calomel, or at all

Calomel.

events salivation, is an antidote to malarious fever. Hence no doubt, the reason why this remedy was formerly carried to so great an extent in the treatment of remittent fever. Cold affusion in ardent cases

Affusion.

is beneficial; in others, in adynamic states, and when organs are affected, it is injurious. Should there be tendency to hepatic or splenic congestion, the wet sheet is likely to do harm by increasing the

congestion. The use of quinine in the treatment of malarious fevers has been gradually gaining ground in India, and may now be said to be universally admitted; it may be combined with treatment suitable to inflammatory, dysenteric and other affections. In King's College Hospital the bowel complication is treated by the administration of milk, beef-tea, and raw eggs; wine or brandy being given if required. Dr. Kelly considers that Belladonna counteracts the *poison* of enteric fever as quinine does that of paludal fever. Dr. Maclagan's instructions regarding the management of the disease are thus expressed: "*Physiological rest of the Bowels.*" For this purpose digestible food in small quantities as can be digested and utilised in the upper part of the alimentary canal; milk in small quantities and often; the tendency to diarrhœa checked by adding lime-water to the milk and giving frequent small doses of Dover's powder: Excessive diarrhœa should be restrained, as by pernitrate of iron, which exerts a corrective action upon the alkaline contents of the bowel. In cases of Indian fever attended by bowel complication Dr. Twining recommends suitable depletion, farinaceous food, and small quantities of wine. Here, then, we have a valuable standard with which to compare the measures employed in cases said to be of enteric fever, that have recently occurred in some regimental hospitals in this Command.

15. *A Typical Case of Enteric Fever.*—With a view to ready reference by Army Medical Officers, and also for purposes of comparison, the following report of typical cases of this disease is summarised from the work of Dr. Murchison, edition of 1862, page 461, viz. I. M. aged 16, admitted 10th September. 'Had been ill 14 days with febrile symptoms, headache, and diarrhœa; during 4 days he had been delirious. *11th September, fifteenth day.*—Pulse 96, compressible. Incessant delirium. Is with difficulty kept in bed. Pupils natural. Countenance pale. Five or six lenticular spots on the abdomen. Lips parched;. tongue red and dry; abdomen distended. Five light yellow watery stools since admission. Ordered beef-tea and milk; 4 oz. of wine; acetate of lead grs. iii after each motion; and a starch and laudanum enema. *12th September, sixteenth day.*—Pulse 120. Temperature in axilla 105 F., several fresh spots. Tongue brown, dry, fissured. Purging ceased after second dose of lead. *16th September, twentieth day.*—Pulse 112. Much more prostrate; hands and tongue tremulous. Noisy delirium has continued except when sleep was obtained by opiates. Pupil small. Some fresh spots appeared, others faded. Sordes on mouth; tongue dry and brown; intense thirst; much tenderness of abdomen. Diarrhœa returned but ceased on repetition of lead. Temperature in axilla 104 F. Urine 20½ ounces containing 292 grains of urea. Six ounces of brandy given instead of wine. *18th September, twenty-second day.*—On 17th pulse 144, now 112, weak, cardiac impulse strong. On the whole quieter; drowsy, almost unconscious. Pupils small. Perspiring, tongue dry, red, fissured; tympanitis; retching; much abdominal tenderness; stools viscid offensive. Urine, 30 oz. alkaline. *20th September, twenty-fourth day.*—Worse; pulse 108; unconscious. Low muttering delirium. Pupils contracted. Tremor; subsultus. Bowels relaxed. Stools and urine voided in bed. *23rd September, twenty-seventh day.*—Improved. Pulse 98. Less drowsy; at times shouts and talks nonsense. Tongue moist, red; abdomen tender. Temperature 100. Urine 31¼ oz. containing 503 grains of urea. *25th September, twenty-ninth day.*—Worse. Pulse 96. Unconscious. Much tremor. Spots all disappeared. Temperature 100¾. *28th September, thirty-second day.*—Better. Pulse 92. Sensible when spoken to. Slept at intervals. Pupils large; tongue red, relaxed. Temperature 100½. *30th September, thirty-fourth day.*—Passed 75½ oz. of urine containing 964 grains of urea. From 28th improved. On 29th October discharged.

16. *Typical Post-mortem appearances.*—The following record of *post-mortem* appearances in fatal cases is taken from the work of Dr. Murchison, viz.:—

Case XLVIII.—*Enteric Fever, with Acute Delirium and Pulmonary Complication.*

* * * *

Autopsy, 33 hours after death.—Rigidity well marked. Body moderately thin. No spots visible on skin. Veins on surface of brain empty over anterior half; full

posteriorly. No opacity of membranes. No sub-arachnoid fluid on hemispheres. Half a dram of serum in each lateral ventricle, and about four drams at base. Brain substance firm; bloody points rather numerous. Heart healthy. Slight hypostatic congestion of both lungs. Scattered through both lungs were a number of isolated nodules, about the size of hazel nuts, the tissue of which was very hyperæmic, friable, and scarcely crepitant, but not granular on section. Right lung 12 ounces, left 13 ounces. Peritoneum contained about six ounces of clear serum. Stomach healthy. The six Peyer's patches nearest to cæcum were indurated, and raised one-tenth of an inch above mucous membrane. Peritoneum corresponding to these patches brightly injected. Solitary glands in lower four inches of ileum and in cæcum and ascending colon, also much enlarged from morbid deposit. Ulceration had commenced in all of diseased Peyer's patches, and in most of solitary glands, but surfaces of all ulcers were covered with yellowish-brown sloughs, still firmly adherent. Small intestine was contracted and empty, and was invaginated to the length of about two inches at three different places; the invaginations were readily reduced. Colon distended with gas. Mesenteric glands near cæcum much enlarged, some of them equalling a pigeon's egg in size. Spleen weighed 13 ounces. Gall-bladder contained pale watery bile. Kidneys hyperæmic, but appeared healthy.

Case XLIX.—*Enteric Fever with Acute Delirium and Pulmonary Complication.*

*   *   *   *

Autopsy, 29 *hours after death.*—Limbs rigid. No spots visible on skin. Right lung 30 ounces; left 24 ounces. Both lungs, but especially right, contained a number of circumscribed nodules of granular consolidation, varying in size from a pea to a walnut. The greater portion of small intestine, and whole of colon, healthy. The disease was limited to lower eight inches of ileum. Mucous membrane, for three or four inches above valve, was one mass of ulceration, surface of which was clean, and edges not at all thickened. Above this were several small ulcers, none larger than a sixpence, the surfaces of which were likewise clean, and in which cicatrization appeared to have commenced; to one only of them a yellowish slough was loosely adherent. Mesenteric glands much congested and enlarged, but none exceeded a cherry in size. Spleen 17 ounces, dark and soft. Gall-bladder distended with a thin, almost colorless, fluid. Kidneys enlarged, each weighing 6 ounces; capsules non-adherent; surfaces smooth; cartical substance hypertrophied.

Case L.—*Enteric Fever at first mild and simulating Remittent Fever.*

*   *   *   *

Autopsy, 29 *hours after death.*—Slight rigidity; no spots visible on skin; body much emaciated. Arachnoid slightly raised above convolutions by serosity. Two drams of serous fluid in each lateral ventricle and more than half an ounce at base. No abnormal vascularity of pia mater or of brain-substance. Brain 50 ounces, firm. Right lung 15 ounces, and left 15½ ounces; indications of old tubercle at both apices, but lungs, in other respects, healthy. Heart 7 ounces; right cavities filled with a dark clot like currant-jelly; left empty. Stomach healthy. Numerous ulcers in lower three feet of ileum, corresponding to Peyer's patches; the largest were near the cæcum; no induration or thickening at their bases or edges; some were surrounded by a loose fringe of mucous membrane, but in others the mucous membrane appeared continuous with surface of ulcer. One ulcer, more than 2 feet above valve, had its edge considerably thickened, and a large yellowish-brown slough loosely adherent to its surface, and two other ulcers in this situation had minute specks of slough still adhering to them. Many of solitary glands likewise ulcerated. Mesenteric glands enlarged, but none exceeded a hazel nut in size. Spleen weighed only 5½ ounces. Kidneys healthy. Gall-bladder distended with a limpid, almost colorless liquid, containing white flakes.

Case LXV.—*Enteric Fever. Acute Delirium. Profuse Intestinal Hæmorrhage, and death on 19th day.*

* * * *

Autopsy, 35 *hours after death*.—Heart 10 ounces; permanent foramen ovale; small white coagulum in right ventricle. Abdominal cavity contained about half a pint of dirty yellow fæcal fluid. The Peritoneal surface of small intestines very vascular, and coated with loosely adherent flakes of lymph. Twelve inches above ileo-colic valve was a semilunar perforation, measuring 2 lines in long diameter, and formed in this way:—An oval patch of peritoneum, measuring 4½ lines by 2 lines, had sloughed, its smooth pale yellow surface contrasting strongly with the surrounding bright red membrane roughened by deposit of lymph. This slough still adherent by its edges, except at one extremity, where it was detached, forming the semilunar perforation. The little opening was plugged by a fragment of slough from interior of bowel. On slitting open intestine, lower four inches of ileum were found to be one mass of ulceration, which terminated abruptly at valve. This ulcerated surface was covered with loosely attached yellowish sloughs and with masses of coagulated blood. Six of Peyer's patches and many of solitary glands above this were ulcerated, yellowish sloughs being still loosely attached to most of ulcers. In one of Peyer's patches was the perforation already described. Some of solitary glands were enlarged from morbid deposit, up to size of a split-pea, but were not ulcerated. Many of solitary glands in cæcum and ascending colon were either ulcerated or contained morbid deposit. Large intestine contained a few ounces of blood. Mesenteric glands were much enlarged, some near cæcum being as large as a pigeon's egg. Liver 60 ounces, anæmic, but healthy; 12 drachms of very pale watery bile in gall-bladder. Spleen, 9 ounces, dark, and rather firm. Kidneys large and very congested; right 6½ ounces, left 5 ounces.

We shall see as I proceed with my inquiry how far the morbid appearances presented in fatal cases among British troops in India correspond with the examples here presented; how far also in many instances they differ widely from such examples.

17. *Causes in particular instances*.—In the outbreak at Clapham the only cause which could be discovered, was that a drain at the back of the house which had been choked up for many years was opened, and its contents spread over the ground; a most offensive odor arose from the drain, and the boys were exposed to it. At Peebles the outbreak was traceable to emanations from foul drains. In the cloisters of Westminster Abbey in 1848 the disease followed exactly the line of a foul sewer neglected for years. At Preston cases were traced to the drain pipe from the water-closet being broken, and fæcal matter from it accumulating under the kitchen floor. At Prades in the Department of Ariège, in 1838 an outbreak was traced to a stagnant pool which was the receptacle of dead animals and of all the sewage of the district; the disease occurred when the wind blew over the infected water. At Windsor in 1858 the outbreak was due to emanations from the sewers. It is now almost universally admitted in England that enteric fever is traceable to air or drinking-water polluted with the products of putrefying sewage. Fæcal pollution of air and drinking-water may, however, exist for years without causing enteric fever, and when an outbreak then takes place it may be in the person of a new arrival. It is a question whether night men, scavengers, and workmen in drains are more liable to enteric fever than other persons; in fact, statistics show that they are not. The disease is not caused by emanations from dead bodies in exhumations, in dissecting-rooms, from putrid meat, old bones, putrid blood employed for refining sugar, horse-slaying yards, or any heap of rubbish or uncovered dung-hill. Free exposure to the atmosphere, or dilution by a running stream may prevent the formation of the poison. In most of the instances in which enteric fever has been traced to fæcal effluvia, these effluvia have escaped into the interior of houses. An offensive privy outside the house is not so dangerous as a badly-appointed water-closet within. Several writers assert that it may be generated independently of a previous case by

Choked drains and pipes.

Stagnant pools.

Sewers.

Fæcal pollution.

Negative examples.

fermentation of fæcal, and perhaps other forms of organic matter. Dr. Harley writes thus: The term pythogenic to imply the putrid source of the disease is, on the one hand, too general, as other diseases arise from the same cause; on the other, it is not sufficiently comprehensive, since it would appear that enteric fever may arise from other causes than putrid or sewer emanations. It has been produced by violent and continuous military exercises and exposure connected therewith, also to great cold after laborious exercises. The causes usually signalised are the following, viz., the more or less immediate vicinity of stagnant waters, marshes, or bogs; the presence of dung-hills; wells level with the ground, permeated with water infected by drains and dung-hills; an overflowing cesspool; a stagnant offensive pond; a yard covered with dung and other refuse; accumulated and pent up sewage soaking through the soil into wells, and giving off emanations into the air, or an obstructed drain. It is observed however, that the practice of cleaning privies and emptying their contents over gardens or fields is offensive but harmless; and cases are related of persons being exposed during several months and even years to emanations from cesspools without suffering from diarrhœa or enteric fever. The disease, according to some authors, may be introduced into the system by means of impure water, contaminated milk, and some other articles of food in an incipient stage of decomposition. The former prevalence of typhoid fever in Millbank Prison was assigned solely to impure water-supply; in August 1864 a pure supply was substituted, and within six days afterwards the disease is said to have ceased. Whether diseased meat alone will produce the disease is a subject of doubt; at the same time it is observed incidentally, that with cattle plague in England there was a great increase of enteric fever among the people. According to Dr. Aitken there does not seem to be sufficient evidence to show that animal and vegetable substances in a state of decomposition can produce disease of a specific nature, maintained and propagated by a specific poison generated in the body alone. Dr. Budd of Bristol is of opinion that the living body is the soil in which the specific poison breeds and multiplies. The *de novo* origin of enteric fever is supported by Drs. Thin, Tweedie, Moore, R. N. McGoun, and others. Dr. McArthur of Illinois cannot trace it to any specific poison, but considers high temperature a factor. According to Dr. Allbutt no simple contamination of water with sewage matter will cause enteric fever unless drainage matter is contaminated by the dejecta of typhoid patients. Troussean observes: "Were I to discuss the influence of an atmosphere vitiated by putrid emanations, the influence of infected articles of food, and contaminated drink, I should be occupying your time with trivialities, because these are nothing more than hypothetical causes." Dr. Grimshaw of Dublin observes that, the exciting cause of enteric fever is now well known to be connected with the introduction of decomposing fæcal matter into the system by the mouth. It has been propagated by means of water tainted by sewage, by milk adulterated with animal matter, and by fæcal matter. On the other hand, Sir R. Christison observes that, although foul air favors the invasion of enteric fever, its true cause is something much more specific, but which has hitherto eluded our search. The disease, he observes, does not always appear where drainage is bad or water-closets are wanting; it is unknown in or near the foul meadows of Craigentinny. Dr. Stokes observes that, if filth and its concomitants are such fertile causes of fever, it ought to be constantly present in most of the districts of Ireland, whereas fever is only present periodically, and will appear at the same time in places far apart; this shows that some mysterious atmospheric causes are at work, that sewers, stagnant pools, privies, &c., are not the originating cause. According to Dr. Peacock there are places constantly saturated with evil odors of all kinds, including that of decomposing fæcal matter; these matters even make their way into drinking-water, and yet no typhoid fever follows. Dr. Strange of Worcester observes that in ninety-nine cases out of every hundred of enteric fever, the origin is not from any germ or contagion derived from the intestines of some person ill of the same disease, but pythogenic. According to Dr. Mackintosh of Chesterfield, all professional men are not yet agreed as to the real cause of enteric fever; while, according to Dr. Barclay, the causation is so little understood that it gives us no help in the diagnosis of this disease.

Summary of assigned causes.

Further objections.

De novo theory.

From the various circumstances here related several points are clear. We learn, for example, that opinions differ as to the exact nature of the conditions and influences upon which enteric fever depends; whether a specific poison is, or is not, necessary for its causation ; that, although in many instances enteric fever is caused by water, milk, or air contaminated by fæcal matter, there are numerous other instances in which, persons exposed to those influences for long periods are not thus affected. We learn that in certain cases enteric fever has arisen as a result of fatigue and exposure of troops on service ; and it is even stated that in some instances, notably in that of Edinburgh, the outbreak of the disease coincided with the introduction of a new and improved system of drainage. With these particulars before us with regard to enteric or typhoid fever as a specific disease, the question presents itself. How far do similar circumstances to those above enumerated affect our troops in India ? Regimental medical officers will consider the most suitable reply to this query with special regard to the conditions of individual military stations. I propose to enter more fully into the consideration of this matter in a subsequent part of the present report.

18. *In relation to Malaria.*—In Rome, towards the end of seventeenth century, irregular intermittent and remittent fevers presented in fatal cases, lesions of enteric fever of the present day. At Copenhagen in 1652 a fever began in autumn after an unusually hot and dry season. That city is situated in a low and moist locality. The fever was attended with quotidian or tertian paroxysms, violent headache and *petechial* spots which appeared during the paroxysms and disappeared in the remissions. The fever ended in profuse sweats, abscesses, diarrhœa or dysentery. In 1669 a similar fever raged at Leyden, also upon a low and damp site. Among the characteristics of the disease were spots, oozing of blood from the nose and bowels, and dysenteric evacuations. The " semi-tertian " of Halle and the slow remittent of London in 1727-28 were of similar characters. During the expedition to the Low Countries in 1745-48 it was observed among the troops that in many instances remittent and intermittent types of fever degenerated into the continued form. Sir John Pringle, alluding to the fevers which then prevailed among them observed that the epidemic varied in character according as to whether they were encamped upon dry or damp soil, and his remarks on the subject are equally applicable to India. He states that the disease attacked the soldiers with greater severity than the officers ; that sometimes the fever was attended by diarrhœa ; that in such cases it was often proper to restrain the latter gradually and to promote diaphoresis. He alludes to the frequent occurrence of *round worms* in the intestines, and quoting from Lancisius ascribes perforations met with in *post-mortem* examination to " the biting of the worms," adding that these entozoa had been found in the cavity of the peritoneum. These and other remarks which occur in the observations by this author on the " Diseases of the Army" indicate that a form of fever having the characters described occurred as a result of malarial influences. As to the expression " Malaria" itself, it may be well to explain that as made use of in this report it applies to endemic influences rather than to a specific entity ; that those endemic influences are as described by Cabanis " l'ensemble de toutes les circonstances naturelles et physiques au milieu des quelles nous vivons dans chaque lieu." In 1806 the troops at Deal suffered from remittent fever, the *post-mortem* appearances similar to those of enteric as now described. At Sheweygheen in Burmah in 1860, the 69th Regiment suffered during the monsoon from remittent fever of a very low type resembling typhus, but without its severe headache on invasion of the attack, or its petechiæ. In several of the typical cases given by Drs. Rankin and Cornish as occurring in India, the attacks set in as remittent or intermittent. In the upper valley of the Thames ague has been very prevalent within the memory of man ; it is now unknown, low fever or mild typhoid having taken its place. The prevailing malarial fever during the Niger expedition was attended by *post-mortem* appearances similar to those described in connection with enteric fever.

Older instances.

Burmah.

Thames.

Niger.

In America the opinion prevails that enteric fever has a tendency to take thh place of intermittents and remittents, as those diseases from the effects of cultivation and other causes decrease or disappear.

America.

Localities where the constitution of the inhabitants is modified by malaria are at times remarkable for the rarity of enteric fever; localities remarkable for the prevalence of enteric fever are noted for the rarity and mildness of intermittents. The drying up of a marsh or its conversion into a lake diminishes or arrests intermittents, but disposes to a new group of diseases, of which phthisis and enteric fever are the most prominent. Instances are mentioned of French regiments returning after a lengthened exposure to malaria in Algeria remaining free from enteric fever, although other regiments quartered in the same barracks had many cases. According to other accounts there is an analogy in many points between enteric fever and diseases acknowledged to be malarious. The varieties of malarial remittent fever are due in a great measure to the dose of the poison, or the locality where this has been generated, and the same remark applies to enteric fever. The early symptoms of enteric fever as already observed, are often remittent in character, the exacerbations occurring in the afternoon or evening, the remissions in the morning. To the several varieties described, *viz.*, the adynamic, abdominal, thoracic, ataxic, sometimes called brain fever, and hæmorrhagic, may be added the ague-like form. This fever commences like an attack of ague; it is chiefly seen in persons who have been exposed to the malaria of ague, and in whom the poisons of the two diseases may be supposed to co-exist. Remittent fever in children may be identical with, or independent of enteric fever. In aguish countries children as well as adults are liable to malarious remittent fever. True enteric fever with rose spots often assumes a very remittent character, especially in children, and is then sometimes benefited by quinine. It is contended by some observers that many cases of remittent fever in children in London and other parts of the country where ague is unknown, are malarial, and curable by quinine. According to Dr. Harley, one of the most general facts observed, is the frequent occurrence of intermittence in the pyrexial condition. In France a more or less intermittent, or remittent character was manifested under a variety of circumstances. It is especially in countries where marsh intermittents are endemic that we see enteric fever assume an intermittent type. Intermittent and enteric fever co-exist at Sheppey, where drainage and the non-removal of nuisances are unsatisfactory. Ague there is rife in summer; bilious remittent, and typhoid fevers prevail in autumn. At Holbeach and Long Sutton ague and enteric fever are prevalent; the conditions in both places which produce the former are favorable to the development of the latter. The camp fever of the army of the Potomac was generally recognized as a typho-malarial fever; symptoms of typhoid fever, diarrhœa, rose rash, &c., were associated with those of intermittent fever; *post-mortem* examination revealed lesions of Peyer's glands. The Walcheren malarial fever in fatal cases presented the appearances of enteric fever. According to the reports by Dr. Davis, that fever assumed the quotidian tertian, double tertian and remitting types; it even changed its type at times to the continued. He believes that the fever would have ceased, but for the derangement it occasioned in the abdominal viscera becoming in some measure a secondary disease. Both malarial and enteric fevers are said to be developed among the same conditions; it is therefore concluded that enteric fever is often a part of intermittent fever and the converse. Paludal enteric fever arises from putrescent animal and vegetable substances. In the districts of Maine, Vermont, and Massachussets, enteric fever predominates among the agricultural population, and is generally associated with the malarious atmosphere prevailing during the autumn months. Typhoid fever of a dangerous type is oftener met with in the hills and in the narrow valleys than where the country is more open. Some cases are sporadic, but it generally prevails as an epidemic. In Pensylvania enteric fever prevails the whole year round, confining itself to the marshy regions and neighbourhood of the water-courses. In Maryland stagnant putrid water and imperfect drainage are considered the most prolific sources of malarial fever. In Kentucky, what was commonly termed typhoid fever seemed to be a remittent fever of a typhoid type. In Ohio various medical men are impressed with the prevalence of typho-malarious fevers; some consider pure typhoid as of rare occurrence, and even place it among the periodic fevers, though presenting rose-colored spots, diarrhœa, epistaxis, tympanitis, &c. In Illinois

France.

Relation to remittent fever.

And to ague.

Potomac.

America.

it is found superseding the common miasmatic diseases in localities that are under a high state of cultivation; it cannot there be traced to any specific poison, but only to the influence of high temperature. In 1861 epidemic typhoid fever at Malta was considered due to bad sewage, overcrowding, defective sanitary arrangements superadded to miasmatic influences. The circumstance of many cases, said to be of typhoid fever, being returned under other heads in army returns in India is explained as due to the intimate alliances that exist between the paroxysmal, the so-called simple continued, and the enteric fevers. In 1864 it was stated, of 24 cases of intermittent fever occurring in the 36th Foot at Lucknow, that at least 10 of them might with equal propriety have been called typhoid. In 1862 Dr. Laycock held to many varieties of fever depending on the evolution of *malarial*, or fæcal, or mixed miasms, any of which could produce continued fevers of a corresponding type. According to Surgeon-General Crawford, A.M.D., the irregular Crimean remittent was in some regiments after May 1855, "a typhoid fever of indefinite duration." In 1858, during the months of March, April and May, our troops engaged in the siege and occupation of Lucknow were encamped in a low polluted locality close to the river Goomtee; on that occasion they suffered much from diarrhœa, dysentery, small-pox, and typhoid remittent fever. In the 71st Highland Light Infantry at Gibraltar in 1868, remittent fever, common continued, and the enteric types were not always easy to distinguish. Surgeon Mullachy, R.N., describing cases of enteric fever on the China Station in 1874, alludes to the resemblance often seen between enteric and the low forms of malarial fever on that coast, and is disposed to think that the distinction between these two diseases is somewhat artificial. Dr. Murchison points out that there is an analogy on many points between enteric fever and diseases acknowledged to be malarious. He places the ague-like form among varieties of that disease—a form chiefly seen in persons who have been exposed to the malaria of ague, and in whom the two diseases may be supposed to co-exist. The "Burdwan fever" is looked upon as having been a malarious typhoid; so was that in 2-13th Light Infantry at the Mauritius in 1866-77. For these and several other particulars I am indebted to a summary of "Some undetermined Points in Typhoid Fever" by Surgeon-Major D. Cullen, A.M.D.

Malta.

Lucknow.

Gibraltar.

China.

Dr. Morehead observes that intermittents may pass into remittents and *vice versâ*; also that some occupy an intermediate position. He observes that the modifications alluded to occur from the intensity of malaria acting on an ordinary constitution, or a less degree of malaria acting on one asthenic. The Sanitary Commissioner with the Government of India at pages 88, 89, and 224 of his report for 1869 gives a number of particulars illustrative of the well-known fact in India, that epidemics as well as endemics of malarial fever suddenly occur from time to time at particular places. Dr. Baikie described the yellow fever at the mouths of the Niger as typhoid remittent. He adds that there is a seeming connection between remittent fever and dysentery, not very easily to be explained, but still very evident. Dr. C. J. B. Williams asks, what do we find in hot climates? He replies, Intermittent fevers assume a malignant form; they become typhoid nearly in their commencement, that is accompanied by an enormous amount of congestion in the internal organs, and by a palpable change in the condition of the blood in them. From these observations then, the conclusion is evident, that a disease presenting the morbid appearances said to be characteristic of enteric fever may be produced by local endemic influences included under the general term "malaria."

Niger.

Malarial fevers, dysentery, and typhoid fevers.

19. *Allusions to the occurrence of so-called Enteric Fever in India.*—Dr. Twining long ago described a fever in Bengal which proved fatal by the occurrence of typhoid symptoms, and in which the small intestines were found ulcerated. He wrote thus—"In the course of almost every protracted fever which terminates fatally in this country there is a period marked by tremor or subsultus tendinum, rapid and feeble pulse, low delirium, brown sordes on the tongue and teeth usually considered *typhoid.*" He adds, that this condition most frequently occurs when the early stage of fever has been neglected or *impro-*

By Twining.

perly treated, although such symptoms do sometimes occur when the most skilful treatment has been employed. Similar occurrences were described in Bombay, Madras, and Burmah. In his remarks however Dr. Twining was careful to note that the organic lesions described by him were results of endemic fever, and not the primary disease itself. With regard to the importance of a correct knowledge of fevers in India he wrote "It cannot be too much impressed on the Indian Surgeon that it is on his careful attention to the phenomena of fever that nine-tenths of his usefulness depends,"— a remark to which I attach the very highest importance. The large work on the diseases of India by Sir James Annesley was published in 1828. The following extracts from that work indicate with sufficient clearness, that phenomena now stated by writers of little Indian experience, or none at all, to be indicative of a newly discovered specific disease, were well known by the older Surgeons in this country, simply as part and parcel of ordinary endemic fever induced by endemic and climatorial influences. Sir James Annesley observes that the more irregularity intermittent fever presents, the greater is the derangement of the abdominal viscera, including liver, spleen, and alimentary canal. During active service, and in malarious districts, intermittents characterised by great debility and a typhoid form of symptoms are frequently met with. He classifies agues thus, namely, (1) the simple and uncomplicated, (2) those with considerable arterial excitement, (3) with exhaustion of the powers of life, or with typhoid symptoms, (4) associated with disease in some internal viscera. The expression typhoid occurs in his pages as here given. He enumerates as varieties of remittent fever (1) the mild form, (2) inflammatory, (3) bilious, and (4) the malignant or remittent with *typhoid* symptoms. When the bilious form is not removed by judicious treatment, or when the means resorted to are calculated to aggravate it, very serious lesions often supervene in the liver and alimentary canal. It chiefly prevails among Europeans who have not been long resident in a warm climate, during the hot months following the rains, and at the commencement of the monsoon. It seems on some occasions to assume an epidemic character. The malignant form occurs in the most unwholesome localities, and most unhealthy seasons. In some cases it presents at its commencement indistinct remissions; in others the symptoms are of a more typhoid kind, the delirium low and muttering, the pulse small and quick, the abdomen tumid and hot, while the extremities are cold. Dysenteric symptoms not unfrequently accompany this form of remittent. In other cases the symptoms are at first mild; suddenly exhaustion sets in, with weak, fluttering pulse, black, dry, foul tongue, offensive evacuations, tenderness of the epigastrium, fulness of the hopochondria, and so on. Sometimes the patient is even able to walk about his apartment for several days; several illustrative cases being recorded by Annesley and Twining. In such cases, injuries of the abdominal viscera may be discovered to have taken place to an extent scarcely admitting of removal by the most judicious treatment.

By Annesley.

Continued fevers are most frequently observed among the more recent visitors of warm countries and constitute their seasoning to the climate. Their principal forms are (1) inflammatory, (2) bilious inflammatory, and (3) malignant or adynamic. The more inflammatory forms of continued fevers occur among recruits during the warm and dry season. It is well to distinguish between the forms of continued fever arising from fatigue, exposure to the sun, to cold and wet, and other accessory causes from those which depend upon exhalations from the soil and in which fatigue, exposure, &c., are merely accessory conditions. The former kind is generally met with among recruits. In some cases of this nature a dysenteric state of the alvine evacuations occurs; there is fulness and tumefaction of the abdomen, the stools are pitchy. Intermittents often run into the remittent type, and then become continued; remittents and continued fevers in their turn change to intermittents. The transition from one form to another is often referable to lesion of some of the abdominal organs; a mild or bilious remittent may become malignant, a continued fever may begin by presenting a predominance of morbid action in the liver, stomach, or bowels. The fevers of the Eastern Hemisphere seldom go through their entire course without presenting morbid action in some viscus or texture, most frequently in those of the abdomen and

cranium. It is not considered however, that the visceral disease in certain localities ought to be viewed as the immediate cause of the febrile excitement,—or in other words that fever is merely a general disorder supervening to disease of a particular organ; on the contrary, the exciting causes of fever produce disorder of the frame generally, which owing to the predisposed state of certain viscera or textures occasions a permanent derangement of them. Among the earliest local symptoms is an inflammatory state of the mucous membrane of the stomach and duodenum; this not unfrequently extends to the internal surface of the small intestines, and even in some cases to the large bowel. The extension of inflammation to the small intestine is indicated by tumefaction and tenderness of the abdomen, diarrhœa, or an intermediate state between diarrhœa and dysentery. The affection of the mucous membrane of stomach and small intestines often supervenes in the earlier periods of fevers; that of the large bowel in the more advanced stages.

In the more malignant kinds of fever, the spleen is often observed enlarged and softened. The duodenum, jejunum, and ileum, especially the duodenum and termination of the ileum, are frequently diseased in their mucous surface, which is inflamed in patches, sometimes covered with a muco-purulent secretion, and studded with small ulcerations, particularly the termination of the ileum. Occasionally the mucous surface is ecchymosed and covered with a bloody sanies. In several instances the ulcerations, which sometimes are large and far apart, at others small and agglomerated—especially the former—have nearly, or actually penetrated the tunics of the intestines. Morbid appearances of the small intestines, such as have been described, are generally found in cases of fever in which diarrhœa and dysentery supervened, and which in their progress assumed an adynamic or malignant form. (Similar appearances are described in fatal cases of enteritis. See the work by Sir James Annesley, Vol. II, p. 24, *et seq.*)

Martin.

Sir R. Martin thus alludes to some of the more prominent symptoms in what he calls "*the Congestive continued fever of the cold season in Bengal.*" Its approach is gradual. Functions of secretion and circulation are little altered. There is a dry harshness of skin, especially of the abdomen; a sense of fulness and oppression at the epigastrium; after a few days headache, lassitude, disorder of the digestive functions, cerebral or abdominal complications. The same neglect may, according to circumstances, induce the fever here described, dysentery, or deep hepatic inflammation. An irritable or inflamed state of the mucous digestive system is a frequent complication. This form of fever is generally continued, but it often assumes the remittent character, especially where the patient has been exposed to malarious influences. When we have the attendants of yellow suffusion, parched or black tongue, jactitation, and generally typhous condition, the state of the patient is perilous. In neglected cases we find hepatic abscess and sometimes ulceration of the mucous digestive surface. I solicit attention to the further description of endemic fevers given by Sir R. Martin in his standard work on the subject, namely, on the remittent fever of Bengal and on ardent continued fever. I would also point out how different was the regime adopted in cases of the affections so named from that followed of recent years in the so-called enteric fever in this country, namely,—

Remittent of Bengal.—The attack sudden, or gradual; after a couple of days, nausea, malaise, headache, and lassitude. The invasion attended by shivering and sense of cold. Features flushed, anxious, bloated; eyes suffused; giddiness; delirium; thirst; oppression and heat in præcordia; skin rough, pungently hot; in persons of phlegmatic habit, at times clammy and cadaveric as if indicative of nervous depression. Abdomen, particularly the epigastrium, tender on pressure, tumid, inelastic. Pulse 110 to 120; respiration hurried, irregular; restlessness. After a time, subsidence or remission of symptoms; the remissions longer in mild cases, shorter in severe. Favorable signs are decreased temperature, descent of pulse to 90. The disease is most severe in the rainy season. In mild cases under proper treatment the symptoms rapidly decline; towards the fifth or seventh day convalescence may be fully established. Untoward symptoms are ever liable to set in, particularly in respect to cerebral and abdominal organs. The form of disease and its symptoms vary according to locality and season. In

treating cases of remittent fever, and indeed of fevers generally, Sir R. Martin remarks upon the necessity of selecting measures with judgment, and of apportioning them carefully. The means indicated by him include emetics, warm bath, tepid and cold affusions, cold drinks, cold douche, purgatives. It is observed however, that cold may be directly injurious when severe internal congestion exists. Blood-letting in various forms (now only practised by leeching and cupping, and less in use probably than it might be), rules in respect to which he quotes from Dr. Robert Jackson. Peruvian bark, superseded now by quinine. The use of depletory, refrigeratory, and antiperiodic means. Diaphoretics; mercury (now much less used than formerly); arsenic, wine, opium, alone or with calomel. To his own remarks he adds a summary of methods of treatment by various authors from 1629 to 1835.

The Ardent Fever of the Hot Season.—Is of all degrees of violence, from febricula to heat apoplexy. In the first of these forms it is usually continued, but may be remittent; the complications may be cerebral or gastric (abdominal ?); the seizure sudden and violent; not the same tendency to collapse as in remittent; heat of skin, headache, rapid pulse in quick succession. The treatment—leeches, affusion, purging, antimonials, calomel, quinine, camphor, opium, wine. In this form of fever, cold affusion, according to Sir R. Martin, exerts its greatest power in abstracting heat and subduing nervous and vascular excitement.

Aitken.

Dr. Aitken alludes to the occurrence of typhoid symptoms in cases of climatorial remittent fever where bleeding had been employed. He quotes from Murchison that bleeding in such cases was tolerably certain to be followed by typhoid symptoms. He observes also that in cases of remittent fever, where typhoid symptoms betray themselves, stimulants must be given.

Morehead.

Dr. Morehead repeatedly alludes to the occurrence of symptoms, and morbid changes as attendants of malarious fevers, similar in nature to those which have of late years been looked upon as characteristic of enteric fever. The following extracts taken from his work on the diseases of India illustrate the views held by him. When intermittent fever occurs in persons of asthenic constitution, we are apt to have complication of gastero-intestinal irritation. Affections of the stomach or bowels were present in 22 out of 243 cases; under the form of dysentery in 11; diarrhœa in 7; gastric in 1. When diarrhœa coexists with intermittent fever we occasionally see a tendency in the febrile accessions to alternate with the diarrhœa. It is probably facts of this kind that led Sydenham to look upon dysentery as fever turned upon the bowels. The remittent fever may be simple or complicated. In the second form there is combined a loca inflammation, or a greater than usual degree of some other kind of local derangement. When remittent fevers pass into the continued form and do not prove fatal in early stages, a new set of symptoms appear, the pulse becomes more frequent and feeble, tongue dry, brown, and is unsteadily protruded, the hands are tremulous, there is low muttering delirium; in other words, the remittent fever has assumed a typhoid or adynamic character. When these phenomena of depressed vital action are present in their most aggravated degree, petechial spots may show themselves on the surface of the body; there may be oozing of blood about the gums and lips, or epistaxis, or vomiting of blood, or melæna, or hæmaturia. Out of 50 fatal cases of well-marked remittent fever at Bombay, death was occasioned by dysentery in 11; by peritonitis in 4. From the writings of Mr. Twining, and more lately those of Mr. Hare, we learn that the occurrence of dysenteric symptoms in the early stages of remittent fever has been frequently observed in Bengal; also that in such cases the type of the fever has generally tended to the congestive or adynamic, and the dysentery to the hæmorrhagic form. It may be also gathered from Hospett's work on the diseases of Algeria and Bleeker's report on the dysentery of Batavia, that the coexistence of dysentery and remittent fever is not unusual in those countries, but that diarrhœa has been a more frequent complication of the latter. In fatal cases in which increased discharges from the bowels have been present during life, we may expect to find

Hare.

Bleeker.

evidences of inflammatory action having existed in the mucous membrane of the end of the ileum or of the large intestine. As cases in illustration I refer to those noted in Dr. Morehead's work as 28, 36, 43, 45, and 46.

Dr. Morehead observes that in years and seasons when the causes are intense, or the predisposition great, remittent fever often assumes a severe form, the tendency to a well-marked remission becomes less apparent, and the worst cases assume an almost continued form for two or three successive days. In the advanced stage of the adynamic state of remittent fever a tendency to gangrene is evinced equally as in European typhus. Dr. Hare had treated 6,982 fever patients in Calcutta; he had only met two cases of typhoid fever with ulceration of Peyer's glands, and both occurred in recent arrivals from on-boardship. He believed that with rare exceptions all fevers in India, whether called ardent, continued, congestive, remittent, or intermittent, were caused by malaria. In reports by regimental medical officers, allusion is of late years made to the causation of enteric fever by exposure to the sun in India, their only reason for so designating the disease thus produced being the discovery after death of ulcers in the ileum; whereas the illness was palpably the ordinary fever of the country. Surgeon-Major Cullen, A.M.D., thus alludes

Cullen,

to such a condition : An ordinary febricula or seasoning fever due to sun exposure, high day temperature, and the system generally being thrown out of gear by the surroundings will attack new-comers to a station; eighty to ninety per cent. will recover, as a rule in a few days, but the remainder will be longer indisposed; in a short time the symptoms have assumed the adynamic form, while the Surgeon, if inexperienced, is puzzled between typhus and enteric, between relapsing and remittent types, until some characteristic eruption or fatal abdominal lesion restores him to his professional equilibrium. He moreover alludes to the existence of intimate alliances between the paroxysmal, the simple continued, and the enteric fever; also to the fact that the gradual evolution of the characteristic symptoms of the latter is by no means the rule in India. I purposely avoid an expression of my own views in regard to the phenomena of Indian fevers, my object being to discuss the present subject upon general, rather than upon personal grounds. If, however, my views are sought for, they are to be found in my work entitled "Experiences of an Army Surgeon in India."

20. *Deductions.*—From the foregoing observations the conclusion is very clear, that differences of opinion exist among the authors quoted in regard to the precise nature of typhoid or enteric fever, as well as in regard to the circumstances under which that disease occurs. Writers in the United Kingdom and on the Continent of Europe describe it variously; (*a*) as a specific disease, the result of a specific cause; (*b*) as produced by emanations from animal and vegetable matters in a state of decomposition; (*c*) as a modified form of typhus. American authors look upon it as being a modification of malarial disease.

From the writings of the older medical officers in India it is equally clear that they considered the occurrence of the phenomena of the disease as ordinary results of local morbific influences of an endemic, and climatorial nature. The younger officers in this country attribute the phenomena to three principal circumstances, namely, (*a*) youth, (*b*) high temperature, (*c*) fæcal emanations in and around barracks. I reply, the disease so named is not confined to the young; high temperature will not alone produce it; and the third cause assigned, namely, fæcal emanations in the places named, does not exist.

21. No doubt the details I have given in the preceding paragraphs are in some respects tedious, nor are they by any means free from tautology; my object in giving them however, in their present shape is, that they may supply a standard of comparison for abstracts of cases now about to follow, the abstracts being themselves taken with much care from hospital records, and believed to present a faithful account of so-called enteric or typhoid fever in the patients whose names are given, with all other particulars regarding them. The experienced will estimate at their true value the several methods of treatment recorded. If cases, not of enteric fever are treated as if they were, it is obvious that in many instances unfortunate results must follow.

WELLINGTON.

The average annual strength of the British troops here is—

Men	523
Officers	13
Women	89
Children	226

22. The records of *enteric* fever at this Convalescent Depôt date from 1872. In that year one fatal case is said to have occurred from this cause. In 1873 there were said to have been four fatal cases of the disease, but no remarks occur in reference to the probable causation in any of them. In,1874 one fatal case. In 1875 one case. In 1876 five cases with three deaths were so returned. In 1877 there are said to have been eleven cases of enteric fever treated, three proving fatal. The periodical rains had ceased during the summer of that year; great drought prevailed, and all forms of fever, as also diarrhœa, were unusually prevalent at the depôt.

1. *Cassen*, 48th Regiment, aged 23 years; admitted 3rd June 1872 under the heading of *irregular ague;* the only further remark, that he was suffering from fever, tongue dirty, stomach seems out of order. Ordered 20 grains ipecac. with 1½ grains tartar emetic as an emetic, and diaphoretic mixture during the day. On 5th had no fever. On 7th slight fever; seems low and weakly. Diaphoretic mixture, and 10 ounces of port wine. The remark made "ague irregular, disease changed to enteric fever," but no further explanation given. On 8th very weak, no fever; tongue brown and dry. At 6 A.M. of the 9th died from intestinal hæmorrhage.

Post-mortem examination revealed ulceration and gangrene of Peyer's patches and lower end of the ileum; the state of the colon is unrecorded.

From the meagre particulars of this case given, nothing further can be learnt regarding its actual nature than that probably it was one of endemic fever attended by extensive intestinal lesion, such as Dr. Twining describes.

2. *Green*, 43rd Regiment, aged 21 years; admitted 3rd March 1873, suffering from flatulence, dyspepsia, prostration, offensive breath and cutaneous secretion. Feverish; diarrhœa; pain in both iliac regions. Treated with ipecac., carbonate of ammonia and compound rhubarb pill; the following day with quinine, ipecacuan, nux vomica. On 7th bronchitis and congestion of left lung; much weakness; tremor of muscular system; evacuated some blood. During that night cough, oppressed respiration. Had senega, ipecac. and squills, with diaphoretic mixture. On the night of the 9th an exacerbation of fever; sputa bronchitic. He was then considered to have had asthma and incipient phthisis. On 13th sputa increased in quantity. Pulv. ipec. co.; acet. plumbi; hydr. c. creta. On 14th three *lenticular spots* on right side of chest. For some days the reports describe recurring exacerbations of fever, prostration, cough and mucous expectoration. On 27th debility and incontinence of urine; emaciation. On 30th strength improved. On April 1st scarcely any cough; no abdominal pain; appetite voracious; had two bed sores. On 6th convalescing favorably. He continued to improve, and on 20th was discharged to attend hospital.

There is in the report of this case nothing to indicate the existence of specific enteric fever. It furnishes a good example of the manner in which cases are designated as of this disease. The patient had diarrhœa, bronchitis, and incipient phthisis.

3. *Gummery*, 43rd Regiment, aged 18 years; admitted 10th March 1873. Febrile symptoms; irregularity of bowels. Is said to have had diarrhœa at Cannanore; tenderness on pressure in iliac region. Treated by quinine and ipecacuan. On 12th an emetic had acted freely; pain in iliac region increased. Had ipecac., acetate of lead and Grey powder. On 14th increased heat of skin; *taches bleuatres* very numerous on abdomen. On 15th a blister applied over iliac region, followed by decrease in pain; some tympanitis; scarcely any febrile exacerbation. Had turpentine and fetid enema, acetate of lead and opium. On 19th only one evacuation in three days; tenderness in umbilical region and upwards in evening; abdomen tympanitic. Dover's powder and acetate of lead. On 21st blue spots on hips and thighs, also on chest and epigastrium; abdomen uneasy; weak, but fever not recorded as present. On 26th little pain in abdomen; bowels regular. Quinine mixture. From this date no positive symptoms recorded till 12th of April. On that date vomiting; discharge of blood at stool; constipation; *hepatic* symptoms much relieved. On 15th a bad day; frequent motions tinged with blood. On 16th hepatic pains extending to the right shoulder. Podophyllin; pil. rhei; ext. hyoscyami; iod. potass; ipecacuan; aromatic spirits of ammonia. On 21st feverish; bowels relaxed; looked ill. Ipecac.; gentian and Grey powder. On 23rd better. From this date an improvement is reported, and on 9th of May he was discharged, as no object could be gained by keeping him longer in hospital.

This was, without doubt, a case of sub-acute *hepatitis* undiagnosed sufficiently early ; the treatment inactive.

4. *Westgate, Royal Artillery,* aged 19 years, admitted 16th May 1873 on account of *enteric* fever. On 14th had an attack of pyrexia, then diarrhœa with debility. Had chalk mixture. The remark made that no insanitary condition existed in the barracks. On 23rd less fever; tenderness and gurgling in right iliac fossa ; no specific eruption. Decoction of logwood. On 26th the eruption had appeared on the chest and abdomen. Tongue brown, dry; diarrhœa. On 30th moved four times in 24 hours; slightly deaf; tongue cleaning; temperature less. Acetate of lead. On 1st and 2nd June slight delirium ; other symptoms as above. On 7th much better ; tongue cleaning; sordes disappearing; moved only twice in 24 hours. On 13th bronchitis ; cough. On 16th slight orchitis. On 20th improving. Continues to convalesce, and on 26th July was discharged from hospital.

There is nothing in the history of this case to indicate specific origin. It appears to have been one of adynamic fever of the continued type.

5. *Robinson,* 48th Regiment, aged 21 years ; admitted 6th June 1873. Six days previously attacked, while under hospital treatment for orchitis, with headache, general malaise and slight pyrexia. Spots looked for but not found ; tonsils and uvula inflamed, swollen ; evening exacerbations. On 6th cerebral and thoracic conplications ; face flushed ; pupils much dilated. As the day advanced these symptoms increased, and at 2-30 P.M. he expired in a semi-comatose state. The treatment consisted of diaphoretics, sedatives, febrifuges, stimulants, counter-irritants, &c.

Post-mortem examination revealed congestion of membranes of brain ; serous effusion in ventricles ; congestion of lungs ; right cavities of the heart filled with dark blood ; congestion of solitary and agminated glands in ileum, with ulceration of the latter.

The case was clearly one of ardent fever passing into heat apoplexy.

6. *Heather,* 107th Regiment, aged 21 years ; admitted 15th June 1874. Simple fever ; peculiar dark appearance of surface. On night of 16th profuse epistaxis ; extreme depression ; sordes on lips ; much pain on pressure in right iliac fossa ; no diarrhœa. Liquor ammonia acet. ; tinct. camph. co. ; wine and chicken-broth *ad lib.* It is recorded that his barrack-room and surroundings were all in perfect sanitary condition. At noon of 18th hands cold and clammy ; sinking ; at 8 P.M. expired. Such is all the information obtainable.

Post-mortem examination revealed slight adhesion of dura mater to calvarium. Peyer's patches congested ; mucous surface of ileum *granular* ; solitary glands of both small and large intestines normal. The precise nature of this case is not apparent from the record. In no respect, however, does it present the characteristics of specific enteric fever. In fact the medical officer hesitated to look upon it as such, in the complete absence of insanitary conditions in and around the cantonment.

7. *Watson,* 43rd Regiment, aged 22 years; admitted 13th June 1875. Cachectic ; skin temperature 101 ; skin dry. Mist. diaphoretic. On 17th skin temperature becoming persistent at 103 and 104 ; deaf ; moved six times in 24 hours ; evacuations yellow, watery. Diaphoretic mixture and quinine. On 20th restless ; slight tenderness in right iliac fossa ; skin temperature 102. Continue same treatment and chloral. On 21st lenticular spots on abdomen ; skin temperature 102. On 22nd iliac tenderness increased ; sordes on teeth and gums ; skin temperature 102. On 24th one evacuation last night ; one or two spots remain ; skin temperature at 9 A.M. 100. Chloral half drachm at 9 P.M. On 27th seemed to improve ; skin temperature 99. From this date he steadily improved, and on 7th August was discharged to attend.

This appears to have been a case of continued fever, non-specific, adynamic, occurring in a subject of inferior physique.

8. *Ward,* Royal Artillery, aged 24 years ; admitted 29th March 1876. Headache; suffused eyes ; high temperature ; constipation without abdominal pain. Quinine ; blister ; James's powder. From that date till 1st April the skin temperature ranged from 101·8 to 104. Then had a hot bath. Tr. digitalis m. 10 ; sulph. quinæ. grains 20 ; liq. morphiæ drachm 1. Diet, beef-tea ; wine 4 ounces. On 6th very much improved ; skin temperature morning 101·8, evening 102·4 ; no pain ; slept tolerably well ; tongue white ; some gurgling in iliac fossa, and, according to the report, "is in a typhoid condition" (no reason appears for his being so considered). On 8th improving. From this date till 10th daily placed in a bath, temperature of water reduced to 76° ; that of body from 102·6 to 99·8. On 10th one rose-colored spot, position not indicated ; tongue typhoid; slept well. Progressed favorably from this date till 18th, when he had some rigors like cold stage of ague, followed by profuse perspiration. Had 15 grains of quinine. On 23rd stated to be convalescent from typhoid fever, but now suffering from ague. From this date recovery progressed, and on 6th June was discharged.

Evidently a case of irregular remittent fever becoming intermittent, induced by non-specific influences. Discrepancies exist between the particulars of this case given in the case-book and those in the *return* ; see Appendix.

9. *McDowell*, 1-21st Regiment, aged 23 years; admitted 23rd May 1876. Skin dry, temperature 103·2; temporal arteries turgid; severe headache; pain all over the body; had been purged during the day. Cold douche and purgative. On 24th profuse epistaxis which gave relief to head symptoms; skin hot and burning. On 26th semi-conscious; tongue dry and furred; sordes on teeth; skin temperature morning 104, evening 103·4; pulse 120 to 140 (unprecise). He gradually became worse, sank, and at 11 P.M. died comatose. No further treatment is recorded. On 26th he is said to have been allowed 18 ounces of brandy.

Post-mortem appearances. Opacity and hyperæmia of arachnoid; increase of subarachnoid fluid; congestion of both lungs; congestion of stomach, duodenum and jejunum; aggregated glands in lower part of the ileum ulcerated; solitary glands of large intestine congested.

This case was clearly one of heat apoplexy, and acknowledged to be so by the treating Medical Officer.

10. *Baxter*, 33rd Regiment, aged 21 years; admitted 29th May 1876. All the symptoms of continued fever. A hot bath of temperature 105, then cold douche while in the bath. Calomel and jalap; a full dose of quinine and tincture of digitalis. The case is said to have gone on fairly well till 12th June, no daily record appearing in the interval. He was then listless and difficult to rouse; pain and ulceration within the mouth; sol. nit. argent. applied; 4 ounces brandy and 6 ounces wine. On 18th delirious and great tremulousness; evacuations liquid, feculent; tongue dry, brown, cracked. Chloroform and chloral. On 21st the disease, up till now recorded as simple continued fever, was stated to be enteric; no reason assigned. On the evening of that day his report states that he was sinking fast; delirium; involuntary evacuations. On 22nd he died at 2 P.M.

Post-mortem examination revealed congestion of cerebral vessels; jejunum and ileum congested; "typhoid" ulcers in the solitary and aggregated glands. The case was one of endemic continued fever, non-specific.

11. *May*, Royal Horse Artillery, aged 23 years; admitted 23rd July 1876. High skin temperature; headache; nausea; had been ill some days. A purgative; warm bath; diaphoretics and quinine. On 26th no better, skin temperature 103. Had a warm bath; brandy 3 ounces during the day and soda-water. On 29th much better: has the regular eruption of rose spots. Quinine 30 grains; tinct. digitalis m. 20; a bath to be cooled down to 80. On 30th ochry stools of typhoid. On 1st August in a state of collapse. Died at 1 P.M.

On *post-mortem* examination arachnoid thickened and opaque; much effusion at the base of the brain and into the cerebro-spinal cavity; congestion of stomach, jejunum and ileum. Peyer's patches ulcerated in the ileum; within 4 inches of ileo-cæcal valve a perforating ulcer, its edges irregular; solitary glands replaced by *punctured?* ulcers. Here the case appears to have been one of *endemic*, non-specific continued fever; no record occurs of abdominal pain. The *post-mortem* appearances illustrate the occurrence of iliac ulcerations in climatorial fevers as observed by the older writers.

12. *Banyard*, 2-16th Foot, aged 22 years; admitted 9th August 1876. Headache; shivering; fever; constipation; tongue foul; skin temperature 100; a hot bath. Calomel and jalap; quinine grains 30; tincture of digitalis 1 drachm. On 11th skin dry, temperature 99·6 in morning, 100 in evening. On 13th eyes suffused, pupils slightly dilated. Bath repeated; quinine continued. On 14th much better; skin cool and moist; no headache; is constipated. On 16th skin temperature 100 in morning, 103 at 2 P.M., 102 in the evening; suspicious *blue patches* over the abdomen. On 20th better: no headache; skin temperature 102. Since previous report had daily cold baths. No pain or other abdominal symptom described, but turpentine stupes applied. On 25th skin moist, temperature 102; bowels not moved; no headache. A mixture of chlorate of potass and hydrochloric acid: no further detail of symptoms. He steadily improved, and on 16th September was discharged to attend.

A case of endemic continued fever, non-specific, acknowledged to be so by the treating Medical Officer.

13. *Day*, 2-16th Foot, aged 24 years; admitted 3rd February 1877. Headache; shivering; foul tongue; skin temperature 100. A cold douche; tincture of eucalyptus 2 drachms; was covered up; perspired freely, and was relieved. On 6th looked dull, dusky; evacuations thin, offensive; headache. It is recorded also that his barrack-room is not crowded, and that he does not frequent the bazaar. Stupes of turpentine to abdomen; brandy 4 ounces. On 7th had passed a restless night; flushed and stupid. During the 8th skin temperature rose and fell four times, ranging from 98·6 to 103. Had been taking chlorine mixture; to continue it. On 10th much better: tongue cleaning; bowels natural. Continue chlorine mixture. From this date recovered, and on 12th March was discharged to attend.

A case of endemic, simple continued, non-specific fever.

14. *Doyle*, 12th Lancers, aged 17 years; admitted 11th May 1877. Obscure febrile symptoms; stupid and languid. On 12th skin temperature 103·4. Had a hot bath; cold douche while in it. On 13th pain in iliac region; gurgling; no eruption. On 15th restless; general abdominal tenderness. Had a cold bath, then quinine 20 grains with digitalis and morphia. The case at first returned as febricula, was now suspected to be typhoid. Highest skin temperature 100. On 17th had passed a good night; tongue brownish and dry; is taking

chlorine mixture. To have 6 ounces of wine and 4 ounces of brandy. On 18th had passed a restless night; no headache; tongue dry, brown. To continue treatment. On 20th an increase of fever; skin dry, temperature 101·8; bowels moved twice, evacuations natural. On 22nd bowels had been moved seven times during night, liquid, yellow; pain in iliac region; restless. Treatment and stimulants continued. On 23rd much irritability of the bowels; evacuations yellow, liquid, tinged with blood; tenderness in iliac region; tongue brownish in centre. On 26th skin temperature in morning 102; restless during previous night; three liquid evacuations tinged with blood and slime. Body to be sponged with tepid water; 2 grains cupri. sulph.; ext. opii grains $\frac{1}{4}$; starch and opium enema; tr. digitalis m. 30; sp. ammon. m. 30 three times a day. On 27th doing well in the morning; during the day looked anæmic and worn; at 9 P.M., while attempting to get out of bed, fell back collapsed; so continued till 12-30 A.M. 28th, when he died.

In *post-mortem* examination membranes of brain congested, especially at base; 4 ounces of straw-colored serum. Congestion of both lungs. In ileum patches of congestion; no ulceration; lining membrane of the colon also congested, but not ulcerated.

The indications here given and those of the temperature chart point to adynamic fever, remittent in type. There is no indication of the disease being specific in its nature.

15. *Rogers*, 12th Lancers, aged 22 years; admitted 30th July 1877. Had been attending hospital for more than a month, being out of sorts; particulars in the case-book too meagre to be of use. Taking quinine; hydrarg. c̄. creta and Dover's powder. On 4th August skin temperature 102; tongue parched. Had a hot bath, cold douche, quinine and digitalis; 10 ounces brandy. On 6th worse: restless last night; deaf; difficult to rouse from listless drowsy state; some suspicious spots like typhoid on lower part of chest and abdomen. On 8th suspicion of the case being typhoid, but no symptoms quite characteristic; very deaf; skin temperature 102; head hot and dry; fulness along course of ascending colon. On 9th becoming worse; leeches to the head; delirious and deaf. At 2 P.M. suddenly expired.

On *post-mortem* examination, dura mater vessels congested; arachnoid opaque and milky; effused serum underneath, partly undergoing organization; 2 ounces serum at base of skull; sinuses congested; substance of the brain congested. In ileum and adjoining part of cæcum 16 ulcers; Peyer's patches congested and ulcerated.

The precise character of the spots is not recorded. The history of the case points to adynamic fever, non-specific.

16. *Hughes*, 43rd Regiment, aged 21 years; admitted 2nd August 1877. High fever; hot skin; foul tongue; thirst; skin temperature in evening 102; warm bath; cold douche. Quinine, digitalis. On 6th had passed a bad night: skin hot and pungent. On 7th worse; skin temperature 103; the stools ochre colored On 12th very high fever; skin temperature in afternoon 104·1, pungent; drowsy. Had 10 ounces of brandy and 16 ounces of wine; cold sponging of surface; aromatic spirits of ammonia; digitalis. On 13th heavy and drowsy, pulling the bed-clothes; skin temperature 102; a few pink spots had appeared the previous day on abdomen; cerebral effusion suspected. Leeches to temples; cold sponging to surface. On 16th considered better: skin temperature 101. On 17th decidedly better: skin temperature 101. On evening of 19th temperature 103; in other respects doing well. Sponging to be continued. On 20th down to 102. On 21st morning 100, evening 103. The treatment does not appear, but since admission he had taken brandy and wine as first stated. On 23rd wine decreased to 8 ounces. On 24th double attacks of ague; temperature 103. Sponging repeated. On 25th ague at 9 A.M. Sponging; quinine 15 grains; arsenical solution m. 5 every fourth hour. From this date did tolerably well till 2nd September, when ague recurred; skin temperature 103·4. On 3rd had a similar attack. From that date improved. On 11th all wine discontinued as it made him vomit. Convalescence progressed slowly, and on 20th October his case was recorded as debility.

A case of ardent fever passing into intermittent.

17. *Clarke*, 12th Lancers, aged 35 years; admitted 6th August 1877. Fever of continued type; skin temperature 101; a purge; quinine; digitalis; warm bath. On 9th the skin temperature 103; had previous day a blister to temples. Continue sponging; 4 ounces of brandy. On 11th skin temperature 102; skin dry. On 13th evacuations ochrey, suspected to be typhoid, but reasons not stated. On 22nd improving; temperature normal; no particulars given of state in interval, nor subsequently till 31st, when he was discharged.

As at first stated in the hospital record, the case was one of continued fever.

18. *Foice*, 45th Regiment, aged 38 years; admitted 30th July 1877. On 16th admitted with a fractured rib. Seized while in hospital with febricula: skin temperature 103; no further particulars given. Diaphoretic mixture. On 2nd August slight headache; skin temperature 102·6; a cold bath. On 8th temperature had continued between 101 and 102; dry; no other particulars given. Wet packing. On 9th the occurrence of *spots* on abdomen and back is recorded; three notes of interrogation after the record in the Case-book. On 11th temperature 102; evacuations yellow; tongue clean; he is cheerful. Taking quinine and Dover's powder. From this date the only particulars given relate to the temperature, which had a daily range from 98·4 to 102. On 7th October was discharged.

The record of the case and temperature chart indicate febricula with a tendency to remissions, but non-specific.

19. *Parrett*, 48th Regiment, aged 23 years; admitted 1st August 1877. Skin temperature 101·4. No other particulars. Wine 6 ounces, brandy 4 ounces. On 7th (no particulars of value being in the meantime given) skin temperature 101; pulse 88; tongue fairly clean; no headache; state of bowels natural. Hot bath and cold douche every two hours. 8 drachms of brandy; other remarks unrecorded. On 12th constipated; enema removed scybalæ and blood; the latter due to hæmorrhoids. On 13th spots which had appeared on abdomen on 10th disappearing, no further description of them given; gurgling in iliac fossa. From this date he appears to have steadily improved, and on 9th September was discharged.

The case appears to have been one of febricula, the febrile condition mild.

20. *Williams*, 43rd Regiment, aged 20 years; admitted 7th July 1877. Hot dry skin, temperature 102·6. Headache; slight cough. Warm bath; cold douche. Quinine; digitalis; head shaved. The case at first noted as febricula, was on 20th noted as simple continued fever; temperature in the interval 101 to 102·6; further particulars not given. On 22nd skin at noon 103·6. Wet sheet packing; diaphoretics; quinine. Taking 6 ounces of wine and 4 ounces of brandy. From the very meagre records of the case he appears to have improved till 14th August when he had a return of fever; skin temperature 103. Diaphoretics, quinine, cold baths; the wine and brandy still continued. On 15th skin temperature 105 over stomach; (in the temperature chart the highest noted is 102·8.) A warm bath; wet blankets; 15 grains of quinine; 10 ounces of wine, 8 ounces of brandy. On 17th slight fever again; abdominal tenderness; disease recorded as typhoid fever; no explanation given. No distinct record of his progress is given until 22nd, when it is noted that he was doing well. He appears to have gradually recovered. On 1st September was discharged.

Continued fever protracted by stimulation.

21. *Herlihy*, 12th Lancers, aged 17 years; admitted 4th September 1877, complaining of headache; literally no further information given. Brandy 2 ounces; 2 pints milk; 2 bottles soda-water; beef-tea diet; treatment unrecorded. On 7th doing well. On 15th high fever *again*; skin temperature 103·6. Warm and cold baths; cold douche; diaphoretic mixture; quinine. On 16th fever not so high. 17th return of fever. 18th morning temperature 102·2. On 19th evacuations alkaline, ochre colored; no spots; disease changed to enteric (no other details given). Turpentine treatment, but no further particulars recorded. From the above date till 23rd, morning temperature varied from 101 to 104. On the latter date rose spots on abdomen; pupils slightly dilated, sluggish; two evacuations characteristic of typhoid (it is not stated how); no blood On 24th turpentine treatment caused vomiting and nausea, it was therefore discontinued. In the evening very weak. On 26th had had a bad night; bowels irritable (a likely result after turpentine); tenderness over iliac region. Lead and opium. On 28th very low. On 29th sordes on the teeth. On 30th better. October 3rd looks brighter; temperature 102·8; pulse 98. Cold sponging; chloride of ammonia; chloroform; sp. ammon. aromat.; nitric acid and bark, quantities unrecorded; but in the evening the temperature had risen to 103·4. On 5th not so well: irritable. On 6th worse; sordes increased on teeth. On 8th heavy and drowsy; calomel; James's powder. On 9th better. From this date improvement advanced slowly, and on 4th December he was discharged to attend.

A case of endemic continued fever with a relapse, attended by a non-specific typhoid condition, as described by Drs. Twining, Martin, and other Indian Medical Officers.

22. *Evans*, 43rd Regiment, aged 22 years; admitted 14th September 1877. Headache; feverish symptoms; skin temperature 103-4; perspiring; bowels acting. Warm and cold bath; diaphoretics; quinine; laxatives. On 17th high fever; afternoon temperature 103-2. On 18th temperature 102. On 19th 102·6. On 20th the disease was *changed* from febricula to enteric fever, but no reason assigned in the record of the case; evacuations yellow, and becoming alkaline. On 21st suspicious looking spots on abdomen. On 24th temperature 101. On 27th doing well. No further particulars, except that on 13th September he was discharged.

A case of febricula.

23. *Jeyes*, 33rd Regiment, aged 22 years; admitted 23rd October 1877. No record on admission. On 27th skin dry, temperature—morning 101, evening 103; pulse 86; tongue coated. Had been taking full doses of quinine and diaphoretics. On 30th fever continued; headache bad; sleeps well. Tongue coated, white, clean at edges and centre; bowels constipated. Castor oil; continue medicine. On 1st November headache continues; skin acting; no prominent symptoms. Continue douche, quinine and diaphoretics. On 3rd skin temperature previous night 104; skin acting; headache continued. Continue diaphoretics without quinine; 6 ounces of wine, 2 ounces of brandy. On 4th sudden acute abdominal symptoms; great abdominal pain; bowels were purged, evacuations dark; skin temperature 104; pulse 130; in afternoon evacuations contained dark blood and clots. Had calomel and opium repeated. At 4 P.M. of 5th pain became excessive in left iliac region, less in other parts; vomiting and signs of exhaustion set in, and at 2-20 A.M. of 6th he died.

Post-mortem examination showed effused lymph on upper surface of both cerebral lobes, congestion of membranes and brain generally; congestion of lungs; extensive peritonitis and

effusion; the ileum for last four inches acutely inflamed and penetrated by two ragged edged ulcers; large intestine healthy.

The history of this case indicates adynamic typhoid or low fever arising from endemic and non-specific causes. The state of the tongue indicated intestinal disorder, otherwise the advent of that complication was unnoticed.

24. *Mrs. Granados.* Her husband in 43rd Regiment: aged 25 years; admitted 25th August 1876. High fever from exposure to the sun while at market; headache; foul tongue. Hypodermic injection of quinine; leeches to temples; tinc. digitalis and Dover's powder. On 27th gurgling in right iliac fossa; no abdominal pain; skin temperature 101·6. On 29th tongue becoming dry; sordes on teeth and lips; very weak. Brandy 4 ounces. On 31st somewhat better: tongue cleaner; bowels slightly relaxed. Continue medicine (it does not appear what). On 2nd September had still further improved; skin cool. From this date steadily recovered, and on 23rd was discharged.

This was a case of *sun* fever from direct exposure, running through the regular stages of such an attack.

25. *Monaghan*, 89th Regiment, aged 14 years; admitted 8th June 1876. Enlarged tonsils; high fever; headache; general pains in limbs and joints. Throat swabbed (not stated with what); mustard poultices; quinine. Had been exposed to direct sun heat the day before attack. On 18th dry, furred tongue; pain in right iliac fossa; has the regular typhoid eruption and typhoid stools (particulars unrecorded). Skin temperature—morning 101, evening 102. On 19th temperature—morning 100, evening 101; delirious; skin burning hot. Chlorate of potash every two hours; 7 drachms wine. On 21st bowels moved three or four times; an increased temperature reduced by a large dose of quinine. From this date improved, convalescence advanced, and on 17th July was discharged.

A case of ardent febricula from direct exposure; cynanche superadded.

26. *Margaret McCarthy*, father in 89th Regiment, aged 15 years; admitted 10th June 1876. High fever; skin burning; constipated; abdomen distended. Douche, diaphoretics, quinine. On 13th very low; skin temperature 101; pulse 104; is restless. Continue treatment. Brandy 2 ounces, wine 6 ounces. On 16th semi-comatose; cold douche, blisters to head, brandy enemas, mustard to feet; skin temperature 101 morning and evening. Continued with little change till 19th; skin temperature then 100 in morning, 103·8 in evening; pulse 100. Had 30 grains of quinine, which reduced the temperature considerably. On 21st a few rose spots on abdomen and left breast. On 24th improving; skin moister; is quite conscious. From this date convalescence progressed, and on 21st July she was discharged.

A case of heat fever, non-specific, running the ordinary course; protracted, in all likelihood, by over stimulation.

Remarks.—Following the above cases in their order the results are as follows, namely:—

1 was of endemic fever; 2, bronchitis, incipient phthisis and diarrhœa; 3, subacute hepatitis; 4, adynamic non-specific continued fever; 5, ardent fever passing into heat apoplexy; 6, indefinite; 7, continued fever, adynamic in type; 8, irregular remittent fever; 9, heat apoplexy; 10, endemic non-specific fever; 11, endemic non-specific fever; 12, endemic continued fever; 13, endemic continued fever; 14, adynamic remittent fever; 15, adynamic non-specific fever; 16, ardent fever, passing into intermittent; 17, continued fever; 18, febricula; 19, febricula; 20, continued fever; 21, continued fever passing into non-specific typhoid condition; 22, febricula; 23, non-specific adynamic or typhoid endemic fever; 24, ardent fever from exposure to the sun; 25, ardent fever from exposure to the sun; 26, ardent fever from exposure to the sun. Thus out of the whole cases here recorded, six only present indications of a typhoid state, namely, 4, 7, 14, 15, 21 and 23, and in all of them the condition occurred as a stage of endemic disease. As to specific enteric fever, pythogenic in its origin, not a single case occurs in the above enumeration, extending over a period of six years.

BANGALORE.

The average annual strength of British troops is—

Men	1,730
Officers	72
Women	288
Children	611

23. The following remarks on the occurrence of enteric fever at the station are extracted from annual medical reports by the Principal Medical Officer of the Mysore Circle, namely:—

In 1867 two cases of the affection are recorded as having occurred in the station, the remark being added, " but conditions necessary for its spreading to any considerable extent appear to be absent." In the fatal cases the peculiar enteric lesions were found well marked.

In 1868 no case was returned as typhoid. It is stated however, that a considerable number of cases returned as continued fever were in reality cases of typhoid; that the diagnosis between the two diseases is not at all times easy. At this station cases of fever occur in the hot season with distinct rose spots, but without any enteric symptoms; in other cases typhoid fever runs its course to a fatal termination without any dryness of the tongue or any approach to the peculiar aspect which usually characterises severe cases of the disease, and in not a few instances so distinct a periodicity is given to the symptoms by the chronic saturation of the system with malaria, that they more nearly resemble those of remittent fever than typhoid.

In 1869 it is stated that 22 cases with two deaths of typhoid fever occurred at Bangalore, and in addition to these, three other cases of the disease, although returned under other heads. With reference to them, however, the principal Medical officer observes that the increased prevalence of the disease has been more apparent than real, being due, so he states, to increased accuracy of diagnosis in febrile cases. The apparent absence of the disease among children is accounted for by the circumstance that in them the characteristic rose spots are either absent or masked by the eruption of prickly-heat.

In 1870, according to records, there occurred 21 admissions by enteric fever, and 4 deaths There were no admissions by the disease in the cavalry, but in the artillery and infantry a very considerable number. In the artillery 10 cases are stated to have occurred without any mortality; in the infantry 11 cases with 4 deaths, a difference partly accounted for by the extent to which the men of the infantry were affected with malarious cachexia and the complication of the enteric fever therewith. It is remarked that in India, the various eruptions produced by heat more or less simulate the rose spots of enteric fever; malarious fevers also are often preceded and accompanied in their commencement by more or less diarrhœa, and when intemperance is the cause of relapse, as seems often to have been the case this year, abdominal symptoms are often present for a time. It is rare to see in India, even in fatal cases, the peculiar condition of the tongue so generally observed in the disease at home; and the peculiar aspect and expression of the countenance so often observed at home is, in India, rather the exception than the rule. In many cases it is quite impossible without having an opportunity of watching a patient from day to day, to say whether he is suffering from simple continued fever (of which there are varieties in India that I have never seen described in books), malarious fever, or enteric fever. The difficulty of diagnosis has been increased by the multitude of fever cases constantly requiring admission, and the paroxysmal form impressed on most diseases by the prevailing malarious diathesis. On this occasion the Principal Medical Officer observes that having the previous year attributed the disease to the use of water from the wells in the ravine near the race-course, these were abandoned and water used from the Dhobies' wells, but the result was not so satisfactory as had been anticipated. In the previous year the majority of cases of the disease occurred among the royal horse artillery in the barrack farthest removed from the Ulsoor bazaar instead of in the one nearest it, as might have been expected; the ranges in which it did prevail occupy the sides of a ravine, the months during which the greatest number of cases occurred being June, July, and August. On this occasion, of 7 cases in the R.H.A. 4 occurred in the block nearest the bazaar and 3 in the one farthest from it. Some of the cases returned as continued fever are said to have really been cases of ebriositas, others so returned, to have been attacks of ardent heat fever and of remittent fever.

In 1871 six cases of enteric fever with two deaths are recorded at Bangalore. The men of the infantry attacked came from different barrack blocks, in none of which were there local conditions to account for their seizure. The cases which did not prove fatal were very slight, and it is probable that several slighter still were returned under other heads.

In 1872 twenty-two cases of enteric fever, 8 fatal, occurred at this station. The difficulty of assigning a sufficient cause for the occurrence of the disease was alluded to by the Principal Medical Officer, who concludes his observations with the remark that " we must look for a combination of insanitary conditions, including those of a more general character " (to produce enteric fever).

In 1873 nine cases occurred without a death from this cause. In three instances patients became attacked while in hospital for other diseases, and all were confined to the royal artillery and cavalry, the infantry remaining exempt; nor could the occurrence of the disease be " connected with any single condition which will bear investigation as to distinct evidence of causation." The barracks of the infantry, who are exempt, are, like those of the royal artillery, near a native town. That local insanitary conditions may have existed near the horse artillery barracks is probable, but such conditions will not account for the disease in the field artillery or in hospital. The men attacked in hospital were under precisely similar conditions as the other patients.

In 1874 there occurred 17 admissions under this head with 3 deaths. Of these cases seven, including the three that proved fatal, occurred in C 19 Royal Artillery, occupying barracks most excellently placed, and their surroundings clean. Of all attacked four were men

over 30 years of age, and four had completed five years' service in India. Many cases occurred in February after a rainless period of five months. Up to 1872 the infantry barracks had suffered from the disease; but neither in 1873 nor 1874 did any case occur there. In some instances the affection was believed to have been contracted in the adjoining foul bazaar. But all Indian bazaars are foul, and yet enteric is most rare among Natives, if indeed it ever occurs.

In 1875 two cases occurred, but without a death, both in the infantry that had during the preceding two years been exempt. The wife of a Non-Commissioned Officer and the wife of an Officer, both in the infantry, had the disease, the attack in the latter being fatal. No insanitary condition existed in barracks or vicinity; the same water and rations were used by all; all alike resorted to the bazaar; and in the case of the Officer's wife, she was in no way exposed to the ordinary causes of enteric fever. During this year six cases of enteric fever, with three deaths, were said to have occurred among Natives at this station, but no particulars are available.

In 1876 no case of the disease is recorded.

The following summaries of individual cases have been extracted by myself from the case-books, namely :—

1. *Brown*, 14th Hussars, aged 29 years; admitted 1st January 1877. Slight fever. On 4th worse; tongue coated; lips covered with sordes; skin temperature 100·4; slight diarrhœa; no abdominal pain. Diaphoretic mixture; 4 ounces brandy; 4 eggs. On 6th pain in lower part of abdomen; skin temperature 103; pulse 120; tongue thickly coated, cracked. On 7th had been moved twice during the previous day; no diarrhœa; skin temperature from 101·2 the previous evening had become normal; pulse 120; no enteric spots. Had 15 ounces of wine during the previous day. On 9th in same condition; slight diarrhœa, checked by starch and opium enemas. At 4-30 P.M. appeared to faint; became congested in face and on the surface; respiration gasping. He died at 4-45, viz., in a quarter of an hour.

Post-mortem revealed serous effusion under arachnoid; congestion of surface vessels; sinuses distended; effusion in ventricles. Both lungs emphysematous and congested. Inflammation and ulceration of Peyer's glands, also in cæcum and large intestine.

The record of the case is imperfect. It seems, however, that the case was one of fever with head symptoms, that is, fever from exposure, or perhaps also from "drink." This is indicated by the *post-mortem* appearances. There is an absence of particulars to indicate specific enteric fever.

2. *Young*, 14th Hussars, aged 22 years; admitted 5th February 1877. Symptoms of continued fever; skin very hot, dry; temperature morning 101, evening 103; pain in iliac region; diarrhœa. Castor oil, fomentations, diaphoretic mixture. On evening of 7th abdominal pain increased, relieved by castor oil. On 8th two or three "typhoid spots;" tongue cleaner, moist. On 10th slight general tenderness over abdomen; skin temperature 100·2; pulse 92; tongue not much furred. On 13th better; skin temperature from 104 on the previous evening 100·4; tongue and lips moist. From this date improved till 23rd; temperature became normal; all symptoms except weakness disappeared. On that morning attacked with shivering; skin temperature from 98 ran up to 101·2; no pain. On 25th pain in left side of abdomen, subsequently diagnosed to be from splenitis. He was treated for the latter and sent to Wellington on 26th March.

The case appears to have been one of febricula. The subsequent "splenitis" is by the record left a matter of doubt.

3. *Weatherley*, 14th Hussars, aged 26 years; admitted 18th September 1877. Feverish; headache; face flushed; tongue tremulous. Diaphoretics, brandy and eggs. Symptoms increased till 20th; then delirious; respiration rapid; skin temperature 101 to 102. Diaphoretics and brandy continued. On 21st very incoherent; no enteric eruption; no abdominal pain, but gurgling in right iliac region; pulse small and rapid. On 22nd worse. Having had ½ grain morphia, slept much last night; face dusky; skin very dry. On 23rd quite unconscious; no diarrhœa. On 24th skin temperature 102; pulse 128; no iliac gurgling; no blood in evacuations; respirations 52; face and general surface much congested. The conditions became worse, and at 10 P.M. of 25th, he died exhausted. The precise treatment followed does not appear. On *post-mortem* examination surface vessels of brain congested; both lungs much congested, spleen large, congested; patches of congestion throughout the large intestine; ulceration of Peyer's patches, raised in size from a pea to that of a rupee.

A case of heat fever, ending in heat apoplexy.

Cases treated in the Women's Hospital.

4. *Mrs. Giles*, 14th Hussars, aged 22 years; admitted 17th July 1877. Ill 9 days; state most serious; temperature 103, at 6 P.M. 104; tongue dry, furred; rose-colored spots on whole surface; abdomen tense; delirium; pulmonary congestion; frequent diarrhœa; evacuations bilious. Frequent nourishment. Quinine grains 10; tr. aconite, m. 2. On 18th skin temperature 105·2,

at 6 P.M. 108·8; unconscions; pulse intermitting. She sank and died at 7 P.M. No *post-mortem* examination.

Nature of this case uncertain. More like ardent fever running into heat apoplexy than anything else.

5. *Riordan*, Royal Artillery, half-caste, aged 10 years; admitted 19th July 1877. Ill ten days. Symptoms of severe continued fever; relaxed state of bowels; abdominal tenderness; skin temperature evening 104·2. On 20th delirium during sleep; three alvine motions "pea soupy." Sponging; fomentations; acid mixture. Skin temperature varied from 101 to 104·2 till 25th. On that day considerable congestion of right lung. Quinine, ipecacuan, sinapism, milk, chicken broth. On 1st August the temperature having meantime varied from 98·6 to 103 it is stated the nature of the case was not clear. On 3rd great perspiration during previous night. This state continued till 8th, when the morning temperature was 99·7, the evening temperature 103·6. On 20th the temperature during the interval had varied from 96·4 to 104. No record of other indications. On that date doing well. On 2nd September discharged.

A case of remittent non-specific fever. This is made the more clear by the temperature chart.

6. *Mary Riordon*, Royal Artillery, aged 7 years, sister of the above; admitted 22nd July 1877. Her state similar to that described in her case, except alvine flux less considerable. Skin temperature 101, evening 103·4. On 23rd high fever. A few "spots" described doubtfully. Ipecac. and sp. ætheris; milk. On 24th skin temperature 103; sleep troubled; bowels torpid; abdomen tumid. Calomel grains 2; pulv. ipecac. co. grains 2 twice a day. On 26th considerable bronchial congestion. On 28th pain over liver; meantime skin temperature varying from 100·4 to 102. On 30th perspiration. On night of 2nd August great perspiration. On 3rd skin temperature morning 99·2, evening 102. General symptoms not recorded. The state continued thus till 6th, when the skin temperature was in morning 97·6, evening 97·4. From this date she improved, and on September 2nd was discharged.

7. *Mary O'Shea*, 45th Regiment, aged 10 years; admitted 11th August 1877. Ill 14 days; diarrhœa. "All the characteristic symptoms" of typhoid, but no details given. Sedative and diaphoretic mixture. On 12th skin temperature morning 103, evening 104; iliac tenderness; bowels relaxed; evacuations like pea-soup. Acid mixture; milk. On 13th delirium the previous night; congestion of base of right lung. On 16th bowels relaxed; drowsiness; prostration; both lungs congested. Expectorant mixture; 6 ounces of wine. On 22nd abdominal tenderness gone; bowels torpid; skin temperature morning and evening 101·6. From this date recovery took place slowly, and on September 9th she was discharged.

The case appears like one of endemic non-specific remittent fever mild in type.

8. *Mrs. Mallen*, 14th Hussars, aged 23 years. On 18th July 1877 admitted with continued fever; discharged on 1st August. On 26th August re-admitted. Ill four days with fever and diarrhœa; skin temperature 104·4 and abdominal disturbance. On 27th a few *rose* spots on abdomen; skin temperature morning and evening 104; conjunctivæ yellow, drowsy. On 28th high fever; profuse diarrhœa; skin temperature 104·2; thirst. Acid mixture; large doses of quinine; cold sponging. On 29th same symptoms; injection of eyes; dusky skin; gurgling in iliac fossa; a few rose spots. On 31st delirium; getting out of bed; iliac pain. Large doses of quinine; aconite; counter-irritation; cold sponging; beef-tea; milk; 6 ounces of wine. On 1st September better; skin temperature morning 101·6, evening 103·2. From this date the condition steadily improved. On 15th still unable to stand from weakness. On 1st October suffered from dysmenorrhœa. On 29th was discharged.

The case appears to have been a recurrence of endemic non-specific remittent fever. The temperature chart indicates this.

9. *Caroline Lambert*, 14th Hussars, aged 5 years; admitted 15th September 1877. Ill two days; high fever; typhoid stools; no rose spots; gurgling in iliac fossa; skin temperature—morning 102, evening 104·4; cold sponging; acid mixture. From that date till 27th the daily variation of temperature was between 98·6 and 101; bowels seem to have been normal except on 25th, when there was diarrhœa; other symptoms not recorded. Treated with quinine. On 28th the temperature was 98·5; diarrhœa. From this date recovery gradually progressed, and on 16th October she was discharged.

A case of febricula, non-specific.

Cases in Royal Artillery.

10. *Wendling*, aged 20 years; admitted 15th May 1873. Attack appeared febricula; particulars not given. On 22nd skin hot, moist; temperature 105; tongue coated, white, flabby; slight abdominal tenderness; a few characteristic spots on abdomen and back. Diaphoretic mixture. On 23rd perspiring freely; constipated. The spots disappear on pressure; they are circular, rose-colored, elevated. On 24th had had diarrhœa. Solution of alum every three hours. During night of that day attacked with severe colic; 30 minims of chloroform did not relieve the pain; had chloral with relief. On 25th diarrhœa; evacuations yellow, alkaline;

not much abdominal pain. Had quinine and sulphuric acid, beef tea, and 9 ounces of brandy. On morning of 25th suddenly seized with dyspnœa. Dry-cupped on back of chest. Sinapism; vin. ipecac. every three hours. This state varied little till 1st June; then progressing favorably; pains in hips; perspiration "acid as in rheumatic fever." From this date he progressed favorably, and on 24th was discharged.

The nature of this case is left in doubt. No history of exposure to causation of enteric fever. The question arises, what was the precise diagnostic value of the eruption? Did its presence ndicate enteric fever alone? Did it accompany endemic non-specific fever?

11. *Bazlett*, aged 24 years; admitted 4th August 1873. Symptoms of dyspepsia. On 23rd fever showed itself; skin temperature 102. Diaphoretic mixture. On 26th diarrhœa; evacuations dark brown; skin temperature 104. On 28th had been slightly delirious; temperature 101; skin moist. On 29th escaped from his ward and wandered to a village near barracks; found there in a very prostrate state. On 30th two or three suspicious rose spots on abdomen, disappearing on pressure; sordes on teeth; tongue dry, brown; temperature 101. On September 1st spots had disappeared; pulse 88; skin temperature 101·8; tongue moist. On 6th was doing well: skin temperature morning 101, evening 99·4; pulse 96. From this date improvement took place. On 15th October he was discharged.

The case appears to have been one of continued fever, non-specific. There is no history of exposure to causes of enteric fever.

12. *Kingsley*, aged 23 years; admitted 8th August 1873 with inflammation of the inguinal glands. On 24th had pain in abdomen; diarrhœa; skin hot, dry; face flushed; tongue dry, furred. Diaphoretic mixture. On 26th, *i e.*, fourth day of fever, skin temperature from 105 previous evening, 102; stomach irritable; otherwise as before. Continue diaphoretics, alum whey. Beef-tea, sodawater, milk. 28th diarrhœa less; febrile symptoms about the same; suspicious rose-colored spots on abdomen, disappearing on pressure. Skin temperature 104 last night, now 102·6. Continue diaphoretics, chlorate of potash drink. On 31st diarrhœa; evacuations yellow, ochrey; a fresh crop of rose spots; tongue dry, brown; sordes on teeth; pulse 80; skin temperature 103 last night, now 102. On 2nd some spots faded; a few more have appeared; skin temperature 102·8 last evening, now 101; subsultus of limbs. On 8th fever stated to be running an uncomplicated course; characteristic spots; gurgling in iliac fossa; subsultus; increased temperature at night. His state continued unchanged till 14th. For the first time his mind wandered; skin temperature 100·6 last evening, now 98. No fresh spots; is very emaciated. Taking alum whey and quinine mixture; 6 ounces of brandy. On 16th convalescent; three evacuations in 24 hours. Skin temperature evening 100·8, morning 99·4; no eruption. Treatment and extras continued. He continued to improve steadily till 6th October, when the skin temperature rose from natural to 100; diarrhœa and slight abdominal pain. This was only for that day. He was discharged convalescent on 19th November.

Here the symptoms described are those of typhoid fever. In the history of the case there is no allusion made to the causation of the disease. Were the phenomena therefore due to specific conditions as fæcal contamination of the air or water, or were they part and parcel of simple continued fever arising from non-specific influences? To my mind the latter was the case. At all events the course of the phenomena was not disturbed by inappropriate treatment. The means used supply a pattern for adoption in similar cases.

13. *Wood*, aged 22 years; admitted 24th August 1873. Had shortly before been ill with diarrhœa; now has pyrexia; has been ill two days; no cause assignable. Diaphoretic mixture; beef-tea. On 29th, *i.e.*, sixth day of attack had slept tolerably well; stomach irritable; skin temperature last night 103, now 102; surface dry; pulse frequent; evacuations *ochry*. On 30th, viz., seventh day, a few rose-colored spots on abdomen (no record of diarrhœa or iliac pain). Continue medicine, alum whey, beef-tea. On September 2nd had not slept well; several times moved, evacuations liquid and bright yellow; pulse 92; skin temperature 103·2 and 101·8. Acid sulph. dil. every third hour. On 3rd, *i.e.*, eleventh day, rose-colored spots; tenderness in right iliac fossa; roughness of respiration in both lungs; skin temperature evening 102·6, morning 101·2; pulse 90. Expectorant mixture; turpentine to chest. On 6th respiratory sounds rougher; has a slight cough. On 7th, *i.e.*, fifteenth day, a thick, well-marked crop of *spots*; slight dyspnœa; skin temperature 101·6 last evening, 101·4 morning. Dry cupping posteriorly; expectorant mixture. On 9th the eruption still well marked; alvine evacuations consistent; crepitus in lower lobe of right lung; skin temperature last evening 104, now 101·4. On 11th passed an evacuation slightly tinged with blood; profuse perspiration (no record of abdominal pain); skin temperature last evening 103·2, morning 101·4; pulse 90. Acetate of lead every 3 hours. Tea and arrowroot, butter; and wine 3 ounces. On evening of that day two evacuations almost entirely of pure blood; the total amount said to be 48 ounces; pulse rapid; extremities cold. Had at the time turpentine m. 10 repeated. At 5 P.M. had gallic acid and opium repeated 4 times during the night. On 12th, *i.e.*, twentieth day of attack, slight reaction; pulse very feeble; extremities less cold than they had been. Acid sulph. dil. m. 30; liq. opii sed. m. 3 every second hour; gallic acid if necessary. Beef-tea, chicken broth, wine 3 ounces, butter. On 18th reaction had set in. On 15th doing very well; one evacuation, fluid but feculent; no spots; skin temperature 102·2 morning, 100·8 evening; respiration easy. On evening of 17th skin temperature rose to 103·4; on 18th morning it was 100; no bad symptoms. Continue

treatment. On 19th bowels had been moved eight times, evacuations foul, containing disintegrated tissue including a slough 2 inches square (no record of abdominal symptoms); otherwise well; skin temperature previous evening 101·2, morning 98·8; pulse 116. Continue treatment. From this date till 28th did well. On that date convalescence advancing. On 1st October skin temperature normal. On 3rd pain in right iliac region; thin, very offensive evacuations, with shreds of disintegrated tissue and mucus. Acid mixture and opium, beef tea, 3 ounces of wine. On 6th pain in right iliac fossa continued; skin temperature 100·4; in other respects doing well. A small blister over iliac region; a large poultice. On 8th twice moved; passed disintegrated tissue and mucus; otherwise well. On 11th doing well; gaining strength. On 13th convalescent. Steadily improved from this date, and on 15th November was discharged convalescent.

A typical case of "typhoid" fever as described in books. Specific causes were absent. Were the phenomena therefore specific, or resulting from general endemic influences? It seems to me the latter. The seat of the disease in the intestine is uncertain. Whence came the sloughs? The treatment in this case was most judicious.

14. *Frost,* aged 21 years; admitted 10th September 1873. For the first ten days very little disturbance; little to indicate disease, except slight increase of skin temperature and general malaise. On 20th skin temperature rose to 104·6. On 21st 102·4; skin dry; tongue brown and moist; headache. On 22nd high fever; skin temperature 103; congested eyes; headache. On 24th skin temperature 105 morning, 105·8 evening; high fever; severe headache. Now the treatment is for the first time mentioned. Quinine ½ grain with acid; sulph. 3 times daily. Beef-tea; tea with milk. On 25th, viz., nineteenth day of attack some characteristic spots on back; left lung congested; skin temperature 104 morning, 105·2 evening. Expectorant mixture, and continue. On 28th no fresh spots; four evacuations of a slight ochrey color; sordes on teeth. On 30th skin temperature evening 104·8, morning 102·6; pulse 98; copious diarrhœa; liquid ochry evacuations with disintegrated shreds (no record of abdominal symptoms). Acetate of lead and opium; continue the quinine and acid. On 2nd October congestion of both lungs; dyspnœa. Dry cupping; turpentine fomentations. Beef-tea, eggs, chicken-broth; brandy 4 ounces. On 5th much dyspnœa and cough; bowels moved eight times. Acetate of lead every 3 hours. On 7th confused; dyspnœa; face less suffused; respirations 50 per minute; sordes clearing; no diarrhœa; no spots. Ammonia mixture every 4 hours. On 11th, viz., thirty-fifth day of illness, better; skin cool, moist; tongue cleaning. Medicines, &c., continued. From this time convalescence advanced. He suffered from periostitis in both legs; does not appear whether it was syphilitic. On 21st December was transferred to another hospital; the issue of the case not stated.

It appears that this was a case of non-specific adynamic fever; its complications pneumonia and periostitis.

15. *Wildish,* aged 22 years; admitted 24th September 1873. Had shortly before suffered from dysentery but recovered. On 30th high fever; rose-colored spots; skin temperature morning 102·8; alkaline diarrhœa. Quinine grains ½ with acid sulph. dil. every 4 hours. Beef-tea, tea with milk. On 2nd October abdominal pain (position unrecorded). Fomentations; continue mixture. On 7th abdomen slightly swollen and tympanitic. On 9th subsultus; cough; congestion of lungs posteriorly. On 11th skin temperature 102; pulse 130; breathing hurried; considerable crepitus posteriorly; subsultus. Ammonia; spirits of chloroform; dry cupping; fomentations; brandy 4 ounces. On 21st, *i.e.,* thirtieth day, considerably better. On 28th great epigastric pain, the cause of which not apparent. With slight oscillations in his state, improved from this date. On 22nd December was discharged convalescent.

Fever of undefined type; irregular, non-specific.

16. *White,* aged 19 years; admitted 16th September 1873. Had been long in hospital on account of dysentery, from which he had all but recovered. On 14th September became feverish; headache increased; and on 19th was intense; nervous depression and irritability; skin temperature 101·2 morning, 103·4 evening, pungent. Diaphoretic mixture every third hour; beef-tea, milk. Blister to nape. On 21st cries a good deal; irritable; skin temperature 103. Bromide of potassium grains 15. Continue. On 22nd same symptoms. Sulph. quinine ½ grain; liq. opii sed. est m. 3 with diluted sulphuric acid thrice daily. Six leeches to temples, which relieved headache. On 24th, *i.e.,* eleventh day of attack, some suspicious rose spots. On 25th they were typhoid in character on abdomen and chest and very numerous. Abdominal symptoms unrecorded. On 26th evacuations typhoid in character; skin temperature 103 morning and evening. On 28th a fresh crop of *spots*; gurgling in right iliac fossa. On 30th diarrhœa; complains still of his head. Cold lotion to head; acetate of lead grains 3 every second hour. On 5th October diarrhœa had much increased. Acetate of lead and opium in enema. Still some headache. On 8th, *i.e.,* twenty-fifth day, his symptoms abated; diarrhœa and headache lessened; deafness. On 13th a number of boils on the neck, otherwise his state unchanged. On 29th headache and fever returned; skin temperature 104. This subsided; convalescence then progressed, and on 22nd December he was discharged convalescent.

Was attacked while in hospital. The case *had spots,* but its course was that of non-specific adynamic fever from endemic causes alone.

17. *Miles*, aged 24 years; admitted 28th April 1874. Symptoms of simple continued fever. On 29th skin temperature; morning 101, evening 103·6; abdomen coverd with sudamina; headache; collected and quiet. Quinine 2 grains with acid sulph. dil. night and morning. On night of 3rd May had chloral; slept afterwards. On 5th *better:* diarrhœa. On 7th skin temperature 102; the patient makes little complaint. Quinine mixture, beef-tea, milk. On 8th slight pain in iliac fossa; a little diarrhœa; no other symptoms; skin temperature evening 103, morning 101. On 18th, *i.e.*, twenty-fourth of attack, convalescence set in. He steadily improved, although slowly, and on 24th June was discharged convalescent.

A case of adynamic or low form of endemic, non-specific fever.

18. *Peile*, aged 21 years; admitted 28th April 1874. Fever somewhat ardent; skin temperature morning and evening 103. On 1st May diarrhœa; evacuations characteristic of enteric fever; no eruption. No other details given. Acid mixture. On 3rd, *i.e.*, eighth day of attack, a few rose spots on abdomen. Liq. opii: sed. m. 5; acid sulph. aromat. m. 10 night and morning. On 4th cough, and congestion of both lungs. On 6th face livid; subsultus; skin temperature 101 morning, 104 evening. Turpentine to chest. Senega, ammonia and chloric æther mixture. On 12th the chest symptoms continued; pain in abdomen (no further details). Continue turpentine fomentations. On 14th, *i.e.*, nineteenth day, respiration free; some diarrhœa; doing well. Beef-tea, wine 6 ounces, milk, eggs and butter. On 1st June, having meantime progressed favorably, skin temperature rose to 103 without apparent cause. Diaphoretic mixture. Another period of slow convalescence. On 27th another slight relapse. His further progress was slow. On 2nd August discharged convalescent.

This case appears to have been one of adynamic fever, non-specific in character.

19. *Gunn*, aged 28 years; admitted 9th May 1874. Ill some four or five days; febrile symptoms and malaise; on 12th ten rose colored spots on abdomen; slight diarrhœa; no other indication noted. Quinine grains 2 with sulphuric acid thrice daily. No complication from this date till 22nd, nor are details further given. On that date skin temperature nearly normal. On 26th convalescent. He continued to do well, and on 24th June was discharged convalescent.

A case of febricula, non-specific. The spots were not minutely described.

20. *Smith*, aged 21; admitted 28th June 1874. On 7th July, evening exacerbation of fever. Particulars of the case then first given. Rose spots had two days before appeared on abdomen. Alvine evacuations ochrey and alkaline. No other particulars. Acid sulph. aromat.; chlorate of potash and liq. opii sed. On 8th diarrhœa. On 9th pain in right iliac region. Pulv. ipecac: c. opio; pulv. ipecac. āā grains 5 thrice daily. On 12th had passed a large quantity of dark blood; lips pale. Gallic acid grains 5; opii grain 1 and repeated in four hours. Beef-tea, chicken broth, milk, butter. On 14th had one copious motion; no blood. On 20th no diarrhœa or other complication, yet very low. Sp. ammon. aromat.; former regimen, and 10 ounces of wine. From this date convalescence set in and proceeded, and on the 16th September he was discharged convalescent.

A case of typhoid or enteric fever as described in books. The temperature chart shows that it was one of endemic remittent fever. No specific cause recorded.

21. *Cox*, aged 25; admitted 21st July 1874. No record of his case till 31st; then skin temperature 102; abdominal tenderness; diarrhœa of characteristic evacuations; no eruption. Had been watched for these. Quinine grains 2; acid sulph. and liq. opii sed. thrice daily. On 1st August very feverish. On 2nd skin temperature 103·4. On 3rd rose-colored spots on chest and abdomen. Fifteenth day of attack diarrhœa; pain in lower part of abdomen; sleepless. Tepid sponging of body; chloral hydrate; beef-tea, milk, butter, wine 4 ounces. On 4th diarrhœa, moderated by acetate of lead. On 7th, viz., nineteenth day of illness, doing well. From that date improved, and on 30th September was discharged.

A case of non-specific remittent fever.

22. *Wheeler*, aged 30; admitted 17th September 1874. Was observed for enteric symptoms; skin temperature 102; no further particulars given. No record of case taken till 28th. On 4th October was doing well. Had chicken diet and porter. On 6th exacerbation; skin temperature 103; tongue furred; slight diarrhœa. Aromatic sulphuric acid and quinine grains 2; record of the case indefinite. He improved, and was discharged convalescent on 3rd November.

Nature of the case uncertain. Nothing to indicate specific enteric fever.

23. *Watson*, aged 24; admitted 13th June 1877 in a low feverish state, having felt ill several days in barracks. On 14th pulse 140; respiration shallow; skin temperature 103·6. No abdominal tenderness, diarrhœa, or *spots*. His state became worse and worse; pulse more rapid and feeble; breathing rapid. He sank, and at 5 P.M. of 14th died.

Post-mortem examination showed congestion of brain and membranes; general congestion of mucous surface of intestines, including cæcum and lower part of ileum; solitary and aggregate glands enlarged; lungs congested.

The characters resemble those of heat apoplexy more than anything else. There is no history given of his habits.

24. *Digby*, aged 33; admitted 29th June 1877. Had felt ill several days, with recurring attacks of ague, to which disease he had been subject. On 30th *characteristic eruption* of typhoid fever on abdomen and back; diarrhœa ochry and alkaline; no organic complications, but he is very low. Quinine grain 1, acid sulph. aromat. and liq. opii. sed. three times a-day. Beef-tea, brandy 15 ounces; milk; butter. On 9th much weaker; muscular twitching; pulmonary congestion relieved by turpentine to the chest. On 11th passing to a comatose state; and on 12th died at 1-45 P.M.

Post-mortem appearances. Lungs congested posteriorly; spleen soft, friable; stomach near pylorus congested; small intestine congested in whole length; Peyer's patches ulcerated; large intestine congested.

A case of adynamic fever from endemic non-specific causes.

25. *Hannah*, aged 22; admitted 15th April 1874. Ill several days; malaise; skin temperature 104·6 at 5 P.M.; pulse 90; furred tongue; thirst; slight diarrhœa; stools yellow, ochry. Treatment unrecorded. On 18th rose-colored spots on abdomen. Diluted muriatic acid, nitric æther, ipecacuan wine. Quinine mixture three times a-day. Beaf-tea; milk. No diarrhœa. On 20th drowsy; face flushed; tongue brown at base and dry; constipated; skin temperature 102·4 morning, 102·8 evening; pulse 86. The progress of the case appears to have been undefined. On 25th he was better; skin temperature 98·4; convalescence then proceeded, and on 18th May he was discharged to duty.

A case of adynamic, non-specific fever.

26. *Howell*, aged 22; admitted 29th May 1877. Malaise during several days. Pyrexia; headache; abdominal tenderness; diarrhœa; evacuations acid in reaction; skin temperature 101. Quinine grains 2 with aromatic sulphuric acid. Beef-tea. On June 1st no material change: bilious diarrhœa; skin temperature 103 evening, 101·6 morning. Diaphoretic mixture. On 4th sore throat; difficulty of swallowing. On 7th weaker; was delirious at night; skin dry, temperature 100; no spots; pulse 94. On 8th some congestion of lungs; tonsils and throat swollen. On evening of 9th profuse perspiration; skin temperature 100·8; delirium during that night; no spots or diarrhœa. On 11th low and delirious; unconscious. On 12th died at 8 A.M., the temperature rising from 103 to 105 before death.

Post-mortem appearances. Brain and membranes slightly congested; lungs congested posteriorly; spleen congested; large and small intestines congested throughout; ulcers about ileo cæcal valve in lower part of the ileum.

The case appears to have been "typho-malarial," such as is described in books. No record appears of specific causation.

27. *Hitchen*, aged 33; admitted 31st July 1877. Had been ailing several days. Had not frequented bazaars or been away from barracks. Pyrexia high; face flushed; skin temperature evening 103, morning 102·8. Quinine mixture 5 grains to the ounce, night and morning. Beef-tea. Diaphoretic mixture. On 1st August skin clammy, but not perspiring. On 2nd had had a restless night; face flushed, pinched, anxious. No diarrhœa or eruption. On 5th worse. Skin temperature evening 103·6, morning 102·6, but to the touch feels higher; pulse compressible. On 6th had had a bad night; tongue covered with a peculiar green fur; skin dusky, burning hot to the touch; temperature 103·8; respiration hurried and shallow; pulse 115, compressible. Ammonia; hydracyanic acid; sinapism to epigastrium; brandy and egg every 2 hours. In the afternoon severe pain in region of gall bladder; vomiting. He sank, and at 5 P.M. died.

On *post-mortem* examination brain normal; lungs adherent and congested; stomach and duodenum intensely congested, also upper part of small intestine, ileum and cæcum; solitary and aggregate glands smaller and ulcerated in some places; liver congested; gall duct contained several calculi.

A case of ardent fever passing into heat apoplexy.

Cases in 45th Regiment.

28. *Payne*, aged 21 nominally, rather 17 by appearance; admitted April 1875 with febrile symptoms; they increased in severity. On 25th tongue red and cracked; slight diarrhœa; *two* or three *spots* on abdomen; no iliac tenderness; somewhat stupid; skin temperature 102. Treatment and diet unrecorded. On 26th spots fading and others appearing; tenderness and gurgling in right iliac region; other symptoms unnoted. Beef-tea, milk, soup. Treatment not stated. On 29th tongue cleaning; no diarrhœa or abdominal tenderness. On 1st May doing well. From this time recovered, and was discharged to duty on the 12th.

As far as can be gathered from a very imperfect record of the case, it was one of febricula from non-specific causes.

29. *Lynch*, aged 28; admitted 30th May 1875 suffering from ague. Quinine. On 31st stated to have continued fever probably modified by malaria. On 2nd June, *i.e.*, fourth day, one or two spots; gurgling in right iliac region; skin temperature evening 103·4. Diaphoretic. On 4th skin temperature morning 101·3; pulse 108; respirations 30; skin moist; constipated. On 5th one or two rose spots appearing; no further details regarding them. On 7th having

had laxative enema; better; abdominal tenderness less. Continue quinine. On 9th much better; pulse 80; respirations 22; skin temperature evening 99·8. From this date convalesced, and on 13th July was discharged to attend hospital.

A case of febricula. Nothing in the record to indicate that the disease was specific.

30. *Mrs. Kearny,* aged 24; admitted 20th August 1876 in a febrile state; weak; purged; vomiting; cough. Was attacked with these on 5th, and since then had daily recurrences of ague. Chalk mixture. Essence of beef; 1 ounce of brandy. On 22nd skin temperature 102·8; pulse 106; respirations 18. In evening prostrated; *musty smell* from her person. Quinine grains 10 and tr. opii m. 20. On 24th the diarrhœa had continued very profuse and frequent; no specific eruption. Chalk mixture and catechu; 8 ounces brandy. On 28th motions passed involuntarily; skin temperature morning 103; pulse 116; respirations 44; cough less troublesome. Continue treatment. She sank and died at 9 P.M., 30th. No *post-mortem.*

The nature of the attack is left uncertain. It does not appear to have been specific enteric fever.

Cases in 1-21*st Regiment.*

Before giving abstracts of individual cases in the 1-21st Regiment, I transcribe the observations made by the Medical Officer in his report on the Battalion for 1870, during which time the corps had been stationed at Kurrachee, namely:—

A very unusual quantity of rain having fallen, the great heat produced a low form of fever accompanied with relaxation of the bowels, approaching the enteric type; this fever continued up to September, the rainy season, when malarial cachexia ague and splenic enlargements rapidly spread through the men, women and children during the months of October, November and December, scarcely a single person escaping, officers and their families suffering in proportion. During this period many guards were discontinued and parades reduced to the men falling in—frequently 40 men representing the entire effective strength of the regiment, more than one half of the men having been sent to an invalid camp at the Gizree sanitarium, so that they might be benefited by the sea air. During the 15 days previous to embarkation there was a slight improvement, no doubt the excitement of preparing for the welcome change to Bangalore buoyed up many a drooping spirit. It was in this sad state that the regiment embarked at Kurrachee for Bangalore on the 15th January 1870.

The following is from the report for 1871, signed by Surgeon Anderson:—

"Regarding the evidence as to typhoid having been brought into the country at the end of 1870 by the 89th Regiment, I beg to remark that when in charge of the detachment of that regiment at Malliapoorum I treated about 15 cases of fever held to be "typhoid" (*vide Madras Medical Journal* for 1872), but which I consider to be pure malarial; in all there was great enlargement and tenderness of the spleen with characteristic remissions. The formation of ulcers of the bowels does not appear to me pathognomonic of enteric fever, as such a condition occurs in many diseases attended with prostration of the powers; if it occurs in hepatic abscesses and phthisis, it may as easily be present in remittent with splenic enlargement. But to show how doubtful the diagnosis of typhoid is, I quote the following remark by Surgeon-Major Kirkpatrick, of the Madras Service (*Madras Medical Journal,* August 1871), "typhoid has of late years been frequently recognised, perhaps more frequently than correctly, as fevers from exposure to the sun are sometimes tedious in their course, and fevers of a malarious origin seem at times to take an extended range which is difficult of explanation."

I here solicit attention to these remarks, the import of which becomes the more apparent when taken in connection with the records of the cases that follow, namely:—

31. *Mullen,* 1-21st Regiment, aged 22 years; according to the case-book, admitted on 9th June 1871 suffering from remittent fever, with adynamic symptoms. Treated with quinine and stimulants. No remark as to causation of attack, or of general conditions of the patient. No record of temperature. On 14th was "doing well; no bad symptoms; little fever." On 20th was said to be convalescing; no record of treatment in the meantime. On 30th no entry of his state being made in the interval, it is stated that he "has had a relapse, owing probably to his exposing himself to cold; also that he is weak, bowels irregular, and fever recurs diurnally." Was then treated with quinine and diaphoretics, but further particulars not recorded. On July 6th adynamic symptoms had recurred; tongue dirty brown; pulse 104; fever very persistent with slight remission. Had *quinine,* ammonia, and stimulants. On 9th was in a state of prostration; slight head symptoms had recurred; fever with a marked remission in the morning, and an imperfect one in the evening; tongue dry and brown; bowels loose, evacuations tinged with blood. Had quinine grains 10 every two hours; carbonate of ammonia every four hours; brandy half an ounce every second hour; acetate of lead grains 2; opium grains ¼ every fourth hour, a blister having been applied to the nape the previous evening. On 10th the record of the case states that the patient lost yesterday a large quantity of blood by stool, leaving him prostrate, with slight heat of skin and in a state of diaphoresis. On 12th he was gradually weakening; had considerable deafness; intellectual faculties impaired; bowels not moved to

any extent; oppression of the lungs with mucous expectoration. To omit quinine; to have carb. ammonia grains 5, tinct. camph. co. 3 drachms, and spirit of chloroform every fourth hour; wine 1 ounce and brandy 1 ounce every hour; pil. plumbi acetate every six hours; beef-tea diet. On 13th became gradually weaker, with oppression of the lungs; sank and died at 3 P.M. In the record of *post-mortem* appearances it is stated that both lungs were congested; mesenteric glands enlarged, indurated and congested; blackening of the ileum and cæcum, where (in cæcum ?) numerous, large, circular gouged-out ulcers were found. Ulceration existed around the ilio-cæcal valve.

There is nothing in the record in regard to the causation of the disease in this case. The attack is stated to have been remittent from its commencement, and the patient had, during the two previous years, been at Kurrachee, where malarial fever was very prevalent. The case appears to have been one of endemic remittent fever, and the *post-mortem* appearances directly connected with that disease.

32. *Smith*, aged 20. On 3rd June 1871, according to the case-book, was "convalescing from fever, but is in a weakened condition, and wine is given." That was on the third day of the attack. On the 6th day he was *discharged*, nor are any more particulars of the case recorded. On 10th June 1871 he was readmitted, having then been in the second day of his illness. He is stated to have had fever of remittent type; debility; weak but not rapid pulse; tenderness on pressure over liver. For treatment he had beef-tea, port wine 1 ounce every hour; a diaphoretic draught every 4 hours, and quinine 5 grains morning and evening. On 12th there were distinct exacerbations and remissions; the tongue was tremulous; perspiration profuse. On 14th had no exacerbation; was improving. On 20th no fever; attacks of pain in abdomen; irregular action of bowels. On 27th the fever had returned almost continuously, except that there was a morning remission. He is weak, skin very hot, with perspiration; tenderness in abdomen. To continue the port wine ½ ounce every 3 hours; quinine grains 10 during remission, and diaphoretic. On 30th there was a remission during previous night; wanders a little; evacuations scanty, brown, watery. On July 3rd had been delirious during the previous night; fever continues with diurnal remissions. On 5th restless and irrational; less fever and perspiration; pulse 112, weak. On 7th a distinct remission; perspiring; very feeble. On 8th had a severe exacerbation last night, in which he died at 3 A.M.

In the *post-mortem* examination the spleen was found much enlarged and indurated; several gouged-out ulcers at the lower part of the ileum, two of them perforating the peritoneum; ulcers of similar character in the large intestine.

In this case there is nothing in the history, such as it is, to indicate causation of enteric fever; there is everything however to point to climatorial remittent.

33. *Steward*, admitted 27th January 1872 suffering from fever and restlessness; rose-colored spots on abdomen; tenderness over right iliac fossa. Had 10 grains of quinine and diaphoretics. On 30th more fever with hard, dry tongue; skin dry; pain over cæcum increased. Had ipecacuan and James' powder, then quinine, diaphoretics and portwine. On February 2nd little or no fever; cessation of pain over cæcum; bowels confined; no spots; tongue dry. Quinine every 4 hours. On 11th symptoms had assumed an adynamic type; he is very low; has but little pyrexia, and that in the afternoon. Diaphoretics and quinine as before; port wine 4 ounces daily. No further history of the case in the case-book. It appears however that he was discharged on 12th March.

From the details given of this case it is difficult to say what was its precise nature. By the case-book record, it was not looked upon at the time of its occurrence as one of enteric fever.

34. *Mills*, aged 20; admitted on 22nd March 1872 with pyrexia; had been ill during three or four days. He had also syphilis. Treated with quinine, 5 grains every fourth hour. On 5th the record is that the symptoms have developed into those of a typical case of typhoid fever. No further details occur. Treatment, quinine, 10 grains three times a-day; diaphoretic mixture; the patient placed in the infectious ward. On 6th had been restless during the night; tongue dry and coated with white fur; slight diarrhœa; pain over ileum; abdomen tympanitic; characteristic rose-colored spots over the surface (of the body ?); severe frontal headache. On 7th aggravation of typhoid symptoms; skin very hot; free perspiration. Quinine to be continued; ice to the head; port wine 4 ounces; On 9th tongue was brown and almost black. Continue quinine; chloral grains 20 at noon, also ½ an ounce of the following, viz., brandy 6 ounces; tr. opii 1 drachm, lemonade 12 ounces; this to be given hot. On 11th very restless the previous night; delirious; urine drawn off by catheter; skin extremely hot, but covered with copious perspiration; fresh spots of rash have appeared; bowels not moved since the 9th; headache continues and deafness. On 12th slight abatement of symptoms. Having taken in all 225 grains of quinine, its further use was stopped. He had an enema of olive oil and turpentine. On 10th except that the bowels had been moved three times the symptoms were much aggravated; delirium and exhaustion exist to an alarming extent. On the 14th the symptoms still further aggravated; the patient sinking; diarrhœa returned. At 5 P.M. he died.

In the *post-mortem* examination the chest and arms covered *with typhoid rash*(?). Abdomen tympanitic and covered with sudamina; posterior part of left lung highly congested; serum effused into pleural cavity; spleen congested; ileum ulcerated at the seat of Peyer's patches, especially nearest the ileo-cæcal valve.

It is difficult from the record of this case to make out its precise nature. The general symptoms are insufficiently detailed, and there is an evident desire to seek for those of enteric fever, although some of the most important were wanting. In the absence of any record of exposure to the causative influences of enteric fever, it seems fair to conclude that the case was one of climatorial continued fever, latterly assuming an adynamic form.

35. *Cook*, aged 22; admitted 18th March 1872. Greatly depressed; features pinched; tongue thickly coated. Had pulv. jalap and quinine. On 20th suspicious spots over abdomen. On 21st skin temperature morning 100, evening 101. On 22nd temperature 104; the treatment in the interval unrecorded. On night of 23rd freely purged. On 24th pulv. ipecac. grain 1; acet. plumbi grains 2; opii. grains 1 thrice a-day. On 25th diarrhœa continues; fever high; pulse 105; temperature morning 103, evening 106. On April 1st rapidly sinking. Died at 2 A.M. of 3rd.

Post-mortem examination revealed patches of ulceration in Peyer's glands and caput cæcum.

From the imperfect manner in which the record of this case was taken it is impossible to say what was the precise nature of the fever. There is nothing to indicate that it was enteric.

Remarks.—The conclusions I arrive at with regard to the nature of the attack in each of the foregoing cases are, that 1 was of heat fever and apoplexy; 2, febricula; 3, ardent fever ending in heat apoplexy; 4, uncertain, more like heat apoplexy than anything else; 5, remittent fever, non-specific; 6, remittent fever, non-specific; 7, remittent fever, non-specific; 8, a recurrence of non-specific remittent fever; 9, febricula; 10, doubtful; 11, continued fever, non-specific; 12, *typhoid* or adynamic fever, no trace of specific cause; 13, *typhoid* or adynamic, specific cause wanting; 14, non-specific adynamic fever, with pneumonia; 15, irregular in type, non-specific; 16, non-specific adynamic fever; 17, non-specific adynamic fever; 18, adynamic fever, non-specific; 19, febricula; 20, *typhoid* or adynamic, specific cause wanting; 21, remittent, non-specific; 22, uncertain, but nothing to indicate specific enteric fever; 23, heat apoplexy; 24, adynamic non-specific; 25, adynamic, non-specific; 26, typho-malarial from endemic influences; 27, ardent fever passing into heat apoplexy; 28, febricula, non-specific; 29, febricula, non-specific; 30, uncertain, but non-specific; 31, endemic remittent fever; 32, climatorial remittent; 33, uncertain, non-specific; 34, continued, becoming adynamic; 35, uncertain, non-specific.

The general result accordingly at which I arrive is that of the 35 cases recorded those numbered 16, 17, 18, 24, 25, and 34 were of adynamic fever from endemic influences; that the case noted as 26 was an example of what has of late years been designated typho-malarial fever; that 22, 30, 33, and 35 are described so indefinitely that it is unsafe to state what was their precise nature; that in 3 cases only, *viz.*, in 12, 13, and 20 did the phenomena of the case correspond with published descriptions of typhoid fever, while in not one of these was the attack traceable to the operation of specific pythogenic causes.

BELLARY.

Average annual strength of the British Forces at this station—

Officers	36
Men	871
Women	130
Children	286

24. In so far as the purposes of the present inquiry are concerned, I am unable to obtain further particulars than are contained in the abstracts of the following cases, namely:—

Cases in 43rd Regiment.

1. *Wilks*, aged 24; admitted 22nd July 1876. On 23rd usual symptoms of fever; bowels regular. Had mist. diaphoretic. 30th no rash except prickly-heat; bowels regular; no abdominal pain. Had diaphoretic mixture; tepid sponging. On 1st August had quinine and subsequently. On 5th August positive symptoms undescribed, but the case was transferred to enteric fever. On 8th, *i.e.*, twentieth day of disease, while coughing, had slight epistaxis; tendency to diarrhœa checked by lead and opium. On 17th, twenty-eighth day, an increase of temperature. On 24th skin temperature 98·6. From this date he improved and was discharged to Ramandroog on the 14th, fifty-sixth day of illness.

There is nothing in the above imperfect record to indicate that the case was one of *enteric fever*; in other respects its nature is left uncertain.

2. *Fagan*, aged 27; admitted 18th February 1877. Ill three days with general malaise and pain in back. On 21st temperature rising; tendency to diarrhœa. Small doses of ipecac. and soda thrice daily. On 25th temperature still rising; tongue coated; pulse 96; no abdominal pain. On 2nd March, *i.e.*, thirteenth day of illness, intellect obscured; spots on *chest* and *abdomen*, fade on pressure; like acne. On 6th tongue dry, brown, glazed; skin hot; spots not characteristic. Treatment unrecorded. On 9th some improvement; no stools. On 12th temperature natural. On 14th had a relapse. On 16th temperature normal; tongue moist. From this date improved, and on 5th April, fifty-seventh day of illness, discharged to attend.

Perhaps a case of mild remittent fever, but the record contains nothing to indicate that it was enteric.

3. *Walsh*, aged 32; admitted 4th March 1877. Ill eight days; skin hot; headache; bowels constipated. Had aperient draught; diaphoretic mixture; quinine and tepid sponging. On 7th spots on body, but not characteristic. On 9th they had faded. On 10th spots believed to have been connected with enteric fever; bowels regular. On 11th, *i.e.*, fifteenth day of illness, fresh spots on chest and abdomen. 12th they fade. On 18th makes favorable progress. On 21st there is congestion of posterior portions of both lungs. On 23rd was low yesterday, but is better and temperature normal. Precise information is not contained in record of his case. He improved and was discharged, whether to duty or as a convalescent is not stated.

Details are wanting to indicate the precise nature of the case. It may have been irregular intermittent; judging from the chart of temperature it does not appear to have been enteric.

Case in Royal Artillery.

4. *Grimson*, aged 24 years and 11 months; admitted 9th June 1877. Severe fever; heaviness in head; sore throat; weak; deaf. Ammonia mixture. In the night a severe accession; face flushed; eyes suffused; tongue loaded. Diaphoretic mixture, then quinine. On 16th had a restless night; bowels natural; sordes on teeth and gums; pulse 96; skin temperature morning 104; deaf, but sensible when roused. Beef-tea, port-wine 4 ounces. On 18th delirious; pulse 96; skin temperature morning 104·6. On 20th, fifteenth day of illness, pulse 120; skin temperature 106; bowels frequently moved; voided in quick succession two large bloody motions, and shortly afterwards died.

Post-mortem examination. Cerebral vessels congested; ascending colon highly congested, its solitary glands implicated; no further particulars in the case-book.

A case of *ardent heat fever.*

Remarks.—Such is all the information available with regard to so-called enteric fever at Bellary. The three first cases here recorded are so indefinitely described in the case-books that only one thing is rendered certain, namely that neither of them was specific enteric fever; it appears impossible to say what 1 was; perhaps 2 was a case of mild remittent; 3, irregular intermittent; 4, was undoubtedly ardent fever.

SECUNDERABAD.

Average annual strength of the British Forces at this station—

Officers	107
Men	2,364
Women	325
Children	645

25. According to reports contained in the proceedings of the Royal Commission on the Health of the Army in India, Vol. II, page 350, the ordinary and endemic diseases of the troops at Secunderabad are intermittent fevers, rarely of an aggravated form, but as relapses occurring during the cold and wet season in those who had been previously subject to them. Common continued and ephemeral fevers less among the British troops than the Natives. Among the British troops an obscurely remittent fever, with an adynamic character, often running into confirmed typhoid, prevails during and immediately after the rains; and this was particularly observable at the time that asthenic dysentery prevailed in 1858, showing an apparent connection in their etiology. The following extracts from Annual Medical Reports of the Hyderabad Circle from the year 1867 to 1876 convey all the information now available regarding the prevalence of so-called enteric fever among the British troops at Secunderabad and at Kamptee. They have been prepared by Deputy Surgeon-General O'Leary.

The year 1867 had an unusually wet season in the Nagpore Command, which generally contributes the greatest proportion of periodic fevers to the returns. In Secunderabad the fall of rain in the same year was a little above the average; 1867 may, therefore, be said to have been a wet year.

"The year 1868 was a dry one in the neighborhood of Kamptee, only 27·73 inches of rain falling instead of about 40, and the fall in Secunderabad was a little below the average; 1868 may, therefore, be said to have been a dry year throughout the Hyderabad circle.

Admissions.

	1867.	1868.
February—Intermittent	1,261	704
„ Remittent	40	136
„ Continued	224	86
„ Typhoid	1	2
Total ...	1,526	928

1869.—Diarrhœa, dysentery, hepatic diseases, and malarial fevers include the bulk of the diseases of climatic origin treated in the Secunderabad Command throughout the year. In October the north-east monsoon was ushered in with plentiful falls of rain and cool weather, when the general health, previously bad, began to improve.

1870.—The diseases endemic to the station were those of the digestive organs, rheumatism, and fevers of an intermittent type. During 1870 the Royal Artillery, 18th Hussars, and both regiments of Infantry have had several cases of enteric fever, and their origin is surmised to arise from bad drainage and impure water. I say surmised, because no source of malaria has been actually and *bonâ fide* traced, and so far as housing, ventilation, food and clothing, no troops could be more advantageously circumstanced, excepting perhaps the accommodation of the 18th Hussars in the old infantry barracks of Secunderabad proper. Had I not myself seen one or two of these cases, I should have been inclined to consider them cases of a low type of ordinary remittent fever, the jungle-fever of Ceylon, and the bilious remittent of the West Indies; but both in life and death the symptoms and appearance of enteric fever were undeniable.

1871.—The diseases which have prevailed among the troops during the year were liver and bowel complaints of severe character, fevers of a simple continued and remittent type, ague slightly, and enteric fever to the extent of eleven cases.

The Surgeon of the 2-24th Regiment is of opinion that the occasional occurrence of cases of typhoid fever in his corps is due to defective drainage, to obviate which, as well as to improve the site generally, shallow saucer drains around each barrack block of buildings were recommended to carry off lodging water. These have been dug, but to the time I write have never been flagged or paved. The Royal Artillery at Kamptee had one case of enteric fever.

1872.—Thirty-four cases of enteric fever, with 13 deaths, all in Secunderabad. Of these, the 16th Lancers had 3 cases, but all recovered; the Royal Artillery 7 attacks, 4 deaths; the 2-24th Regiment 19 attacks, 7 deaths; the 76th Regiment 5 attacks, with 2 deaths.

Medical Officers in their reports have furnished very scant information generally on this important disease. The conclusions, however, arrived at are that the disease is endemic, attacking young soldiers shortly after arrival, and not entirely depending upon defective drainage or other insanitary causes. Dr. Corbett, 107th Regiment, thinks that a native latrine within the entrenchment might have been the exciting cause of the disease while the 2-24th occupied the lines. Dr. Cullen, of that corps, for a long time attributed its existence to defective drainage. Dr. Sinclair, Royal Artillery, inclined rather to the idea of importation and latency of the virus in his men, but the period of incubation was too long and remote. Dr. Innes, 16th Lancers, held his ground on the insanitary site of the barracks and its morbific area, which have been the cause and origin of all diseases in the corps since it set foot in Secunderabad.

Enteric fever, though generally acknowledged to be of a non-contagious character, has virtually been treated as contagious here, first by isolation of the patient, second by careful disinfection of his secretions, and third by purification of the ward, linen, and bedding in which he had laid and worn.

1873.—One case only of enteric fever in the 16th Lancers recovered. The extent of this disease bears a most satisfactory comparison with 1872, when 34 cases with 13 deaths occurred; and would seem to favor the theory that enteric fever is inimical to unacclimatised troops, all the troops in the circle during 1873, excepting B-C Royal Horse Artillery and a few recruits, being composed of men resident for some time in India.

The year 1873, in many respects, has been a peculiar one. The hot season from March to June was one of the most favorable in comparison with other years, its mildness tempered by heavy showers which fell in April, and by an almost complete absence of the usual hot dry winds. The rainfall was scanty, and the cold weather little or none.

In 1874 seven cases of enteric fever with 3 deaths. Of these, 3 admissions with 2 casualties occurred in the 76th Regiment, Secunderabad, and 4 admissions with 1 death in the 44th Regiment, Kamptee. The first case of this disease in the 76th Regiment, and which proved fatal, was not diagnosed as enteric fever, but was returned and treated as one of simple continued fever with peritonitis. After death an ulcer was found in the lower portion of the ileum with Peyer's and the solitary glands normal, and the case was then considered as one

of enteric fever. He was a young soldier, 23 years of age, one year and six months' service in India.

The second case, also a young soldier, aged 21 years, service in India 10 months, was in the first instance admitted into hospital under the head of simple continued fever, but very soon symptoms of a typhoid type were developed, ran their course, and terminated fatally, the *post-mortem* examination showing all the characters of the disease well marked.

The third case, a lad 20 years old, one year's service in India, was undoubted in its characteristic symptoms almost from the very first. It was about one of the worst cases I ever saw do well, depression, delirium, subsultus, involuntary passing of evacuations, all being continuously and for a long time present. Careful nursing and judicious treatment effected complete recovery, and the man has been sent to the Wellington Depôt for change.

The origin of the disease in this corps was most obscure in all cases. The sanitary condition of the barracks, its latrines, urinals, &c., was satisfactory, and an analysis of the water showed it, if not quite free from organic matter, certainly not contaminated to such an extent as could be considered injurious (1·03 per gallon). The only possible, but at the same time unlikely, source of the poison was a tract of swampy land to the west of the barracks, in which it was supposed decomposition of animal excreta might be going on, and which it was suggested should be drained as a means of improving generally, if not specially, the neighborhood of the lines of the corps in question.

At Kamptee, where there were 4 cases with 1 death, the admissions took place in July and August, when the weather was wet and the air loaded with moisture. The men were young (the greatest age being 25), but only one, the fatal case, was of short service (five months) in India. The other three came to this country with the regiment, and might be considered acclimatised. In the fatal case there was perforation of the small intestine and ulceration of Peyer's glands. Dr. Macqueen is at a loss to account for the origin of this fever, but thinks, hypothetically, that it is possible that decaying animal and vegetable matter dissolved by rain may have percolated into the wells. In every case of typhoid fever, both in Secunderabad and Kamptee, strict isolation has been carried out, and the disinfection of the evacuations, clothes, bedding, has been closely attended to. Treatment in some respects has varied, but quinine, wine, acid, and stimulants have been the sheet-anchor.

1875.—I notice in the returns from regiments the occurrence of several cases of enteric fever from both at Secunderabad and at Kamptee.

1876.—Assuming that polluted water is capable of originating enteric fever, the exemption of the force at Kamptee gives a significant support to the theory, as there the wells are so protected as to exclude impurities, and the behaviour of the disease in the 2-16th Regiment at Secunderabad points in the same direction. In this instance it was found that when the source from which water for consumption was closed against further supply the disease vanished, and under that restriction did not reappear. It is likewise worthy of notice that its prevalence was chiefly confined to the two Infantry regiments at Secunderabad, and as both lie comparatively close to each other and their wells are not very far apart, the same cause may have been in action for each. On this point it is, however, impossible to speak with any certainty, and no information is afforded; but in any view of the subject it must be held as a maxim that no source of supply in this country can be regarded as absolutely pure that wants the protection afforded by an impervious shaft and cover, and that to this safeguard must be added a filtering bed. In the absence of this arrangement, water-carts should replace the puckali system, as the conductors of bullocks are not reliable, and it is difficult to ensure the bags being used exclusively for the public service.

The mortality was high in the 2-16th Regiment, nearly equal to 50 per cent. Their cases, too, were unusually severe, and the cerebral complications very prominent. In fact, the nervous symptoms practically marked the course of the attack, and it was found in one instance almost impossible to discriminate between the existence of fever and of *delirium tremens*, the *post-mortem* examination only settling the point. In the 44th Regiment the characteristic eruption was absent in every case but one, and from the short duration of the attack in many—one was but ten days in hospital—correctness may in some instances be questioned. The mortality was excessive, however, and the convalescence in recovering patients long deferred.

The 16th Lancers lost one man. The origin of the disease is set down partly to the use of milk possibly infected, and partly to association with members of another corps in which the ailment obtained, no definite opinion being advanced in either case.

The Royal Artillery furnish 4 cases, of which 1 occurred in a man at the Wellington sanitarium and the remainder at Secunderabad. No cause is assigned for the attack in either instance, and it is to be presumed that its character must have been severe, as two out of the four died. In one case the patient was in hospital for gonorrhœa when the disease supervened.

Reviewing this subject broadly the fatality has been great, and judging from experience of the disease as it presented at another station in the Presidency, the type must have presented novel features. There the head was rarely engaged and the abdominal symptoms predominated, while here the seizures appeared to have frequently mimicked the remittent form of fever, and to have killed by cerebral effusion. The mortality, too, was remarkably diverse, as a death seldom occurred at that station; here one in three or thereabouts. As the reports afford little information as to the treatment adopted, it is impossible to speculate upon the results or to form an opinion on the connection between the mortality and the means used to ward off a fatal issue."

With reference to these remarks it seems to me evident that Medical Officers were describing endemic non-specific fevers.—C.A.G.

The following abstracts of cases of so-called enteric fever have been prepared by Surgeon-Major Sinclair. The remarks appended to each are by myself after a careful perusal of the record of each in the case-book, namely :—

Cases in Royal Artillery.

1. *Smith*, aged 21 years and 8 months Healthy, had no previous sickness in India. Admitted 10th October 1876 with *gonorrhœa;* changed after to enteric fever; came on gradually, commencing about twelve days after admission. Tongue dry, not much coated ; temperature high from 22nd October, but rising much on 28th (seventh day) ; diarrhœa stools, pea-soup like and copious ; abdomen tender, particularly over region of cæcum, and afterwards tympanitic; deafness; stupor; muttering; delirium. Congestion of lungs on eleventh day; rose-colored eruption on abdomen and chest on fifteenth day; pulse at first not much affected, on tenth day 120, quick and soft, rising after to 140 ; stools latterly passed involuntarily; died 7 A.M., 8th November 1876. *Treatment* consisted in diaphoretics, large doses of *quinine*, cold affusion, afterwards poultices and sinapisms to chest, mineral acid, liquid food, milk, beef-tea, &c.; stimulants as indicated.

Post-mortem showed *lungs* somewhat congested ; typical lesion of enteric in ileum; Peyer's glands in *various stages* of *disease ;* near the cæcum ulcerated, higher up less advanced ; spleen enlarged, weight 14 ounces.

The record of this case and the chart of temperature alike point to ardent fever passing into erythismus tropicus, or heat-apoplexy.

2. *Mills*, aged 24 years; admitted 1st November 1876. A healthy young man ; no sickness previously in India. Admitted with slight fever and diarrhœa: enteric at once suspected. Had been ailing for eight days previously to reporting sick ; temperature high. Headache; diarrhœa of light, yellow-colored, thin stools ; tongue dry at first, furred slightly; tenderness over cæcum; slight tympanitis; deafness ; pulse not much affected in frequency till twentieth day, weak and soft. In the fourth week lungs somewhat congested and passed much blood by stool ; pulse then went up to 140; after, stools again became pea-soup like, then clay-colored; no eruption visible; no delirium; little or no stupor. *Treatment:* diaphoretics, Dover's powder, hydrochloric acid, chloral at night, ice, sulphuric acid and ergot for hæmorrhage of bowel, cold affusion, sinapisms to chest, tonics, liquid food, milk, beef-tea, &c., with lime-water; stimulants as indicated.

Nothing in the record of this case to indicate that it was specific in its nature. No record of exposure of the patient to the assigned causes of enteric fever.

3. *Barnett*, aged 21 years; admitted 12th December 1876. A healthy young soldier, recently arrived in India, where he had not had any sickness prior to admission on 12th December with enteric. Stated he had felt ill since 27th of previous month, from which his attack must date. Temperature high ; general febrile symptoms; deafness; want of sleep ; diarrhœa, but not to any great extent; stools light yellow and characteristic. During fourth week eruption of rose-colored spots over abdomen, chest, and back ; pain in right hip and groin complained of; no tenderness over abdomen. The deep-seated glands in right groin painful. Treated with Dover's powder, diaphoretics, dilute hydrochloric acid, hydrate of chloral at bed-time, fomentations to hip, liquid diet as much as possible, but soon refused milk; wine on thirty-fifth day. A mild case, made a good recovery and was sent to the hills in March.

A case of ordinary climatorial fever; no record of exposure to assigned causes of enteric fever.

4. *Arbon*, aged 26 years and 5 months; admitted 27th February 1877. A healthy young man; had been about seven and a half years in India; had no sickness recently. Admitted with high fever ; temperature of 106°, and every appearance at first of a case of ardent fever approaching sunstroke. Had felt out of sorts for some days previously, and the day preceding admission had been out shooting and exposed to the sun all day. Under the application of "cold packing" and diaphoretics the acuteness of the fever was subdued, but typical symptoms of enteric were gradually developed. Diarrhœa, copious pea-soup like stools; gurgling and tenderness on pressure in right iliac region. Tongue dry, much furred; deafness; spongy gums; pulse not much affected, never over 90, but soft and weak ; rose-colored spots end of first week, not numerous; stupor ; slight delirium; considerable and persistent tremor of hands. Treated by packing in wet sheet twice or thrice a day, diaphoretics, bromide of potassium at night, quinine latterly, liquid diet, milk, beef-tea, &c., stimulants as indicated, beginning on fifteenth day.

The case was one of ardent fever, an ordinary result of exposure to the sun. This indeed is recorded in the case-book by the treating Medical Officer. From the records of the case in the case-book it becomes impossible to follow up the continuity of treatment.

5. *McCartney*, aged 22 years; admitted 2nd June 1877. A healthy young man; three and a half months in India; had no previous sickness. Admitted on 2nd June under the head of simple continued fever, changed on 13th idem to enteric, which was then clearly developed? Had been ailing four days before admission. Temperature steadily rose; tongue a good deal

coated and dry; headache; bowels at first constipated, but in second week diarrhœa with pea-soup like stools set in; deafness; rose-colored lenticular spots apparent on thirteenth day; not much stupor; no delirium; general drowsiness; slept well at night; took all food eagerly. A mild case and progressed favorably. Treated at first with diaphoretics and quinine, after by cold affusion, diaphoretics and hydrochloric acid, liquid food, milk, beaf-tea, eggs, &c., stimulants as indicated; wine given on fourteenth day.

The records in the case-book contain nothing to indicate specific fever; rather the case appears to have been one of the ordinary climatorial fever with irregular remissions.

6. *Lieutenant Bevan,* aged 26 years and 6 months; admitted 7th July 1877. Had not been in good health for some months before attack. Returned from Trichinopoly, where he had been for three weeks on leave on 18th June, and on 24th was placed on the sick list on account of an irritable ulcer on the left instep, commencing from a mosquito bite. On 7th July febrile symptoms first manifested themselves and gradually developed into enteric. Headache intense and persistent for days; want of sleep; bowels not at first affected; tongue furred and dry; rose-colored spots apparent on eighth day; diarrhœa with the usual light yellow-colored stools during third week only; no iliac pain or tenderness; no delirium; pulse soft and weak, but not over 88. In this and two preceding cases the pulse did not increase in proportion with the temperature. Night-sweats severe from beginning of fourth week until commencement of convalescence. Was a mild case; cannot be traced to any importation, exposure, or sanitary defect. Treated by diaphoretics, bromide of potassium at night, hydrochloric acid, quinine in large doses with sulphuric acid for night-sweats, plenty of liquid nourishment, Madeira, and other stimulants as indicated.

There is nothing in the record of this case to indicate that the fever was enteric; on the contrary, the record renders it tolerably evident that it was not.

7. *Catchpool,* aged 22 years. A healthy young soldier, has been only a little over four months in India, and hitherto enjoyed good health. Admitted on 24th July 1877 with usual febrile symptoms under the head of febricula, changed to enteric fever as this subsequently was developed. Soon after admission diarrhœa set in, stools at first clay-colored, afterwards the usual light yellow color; tongue coated at first, but soon improved; no iliac tenderness; temperature high at commencement with usual evening increase; severe headache; deafness; stupor; no delirium; rested fairly at night; rose-colored spots well marked on sixteenth day. On nineteenth day epistaxis occurred. A mild case, treated with diaphoretics, packing with wet sheet when temperature over 103°, dilute nitric acid, tonics, milk, beef-tea and other liquid diet; stimulants on sixteenth day and as indicated.

The record in the case-book is meagre on all points except that of temperature. In that record there is nothing to show the existence of specific fever. The abstract and temperature chart both point to febricula.

8. *Coley,* aged 26 years. A delicate man, though had not suffered from any sickness of consequence during the twelve months prior to admission; sent to the Hills in 1875 for debility. Admitted with high fever of a continued character, febricula, on 31st July 1877, but enteric was soon manifested; temperature high; diarrhœa; severe headache; tongue much coated; pulse rapid, soon became small and weak; diarrhœa excessive for some days with characteristc light-colored stools; little or no tenderness in iliac region; no tympanitis; great restlessness; stupor; deafness and muttering delirium; copious eruption of rose spots on tenth day; great congestion of lungs; end of second week much prostration. *Treatment:* cold packing in wet sheet, diaphoretics, Dover's powder and sulphuric acid for diarrhœa, sinapisms and poultices to chest, dilute hydrochloric acid; liquid food, as much as could be taken; stimulants required early on seventh day. A short but severe case, due doubtless to want of stamina.

A case of climatorial ardent fever; the temperature chart almost identical with that of Barnett.

9. *Rose,* aged 27 years. A strong man of 5½ years Indian service; generally in enjoyment of good health, and with exception of six days in July last, when in hospital with febricula, had not been sick for over twelve months. Admitted on 4th August 1877 with high temperature, which soon assumed the characteristic morning and evening alternations, and it is doubtful at what day fever had arrived. On admission tongue clean; bowels loose, dark bilious stools, and *appearance more that of ardent fever than any specific form.* On seventh day eruption of rose-colored spots apparent, which afterwards became well marked; stools assumed the yellow ochreous color and tongue became furred; no iliac tenderness or tympanitis; no delirium; merely deafness, confused manner, and slight stupor; slept fairly. Recovered 14th September 1877. A mild case; diarrhœa never severe. Treated by cold pack twice or thrice a day when over 103°, diaphoretics, nitric acid, milk, beef-tea and other liquid food; stimulants on twenty-sixth day.

According to the record in the case-book the nature of the attack was common ardent fever. The precise character of eruption not given. The subsequent history, as given in the case-book, is meagre and indefinite, nor is there anything in that record to support the statement that the case merged into enteric fever.

10. *Newton,* aged 21 years; admitted 27th July 1877. A healthy young soldier of five months' Indian service, during which time has had no admission excepting for three days in

June with slight diarrhœa. An obscure case; at first admitted with ordinary febrile symptoms under the head of febricula. No bowel affection; pulse fair; tongue clean; after, fever assumed a decidedly intermittent type for about a week, the morning temperature falling to the normal; in part of third and fourth weeks there was a continued high temperature, succeeded by the usual alternations, until beginning of sixth week, when the normal was again reached. Rose-colored spots appeared on eighteenth day, persistent for ten days, with great increase from twenty-second day, when there was also an aggravation of all symptoms. Tongue became foul and furred; pulse 108, and rather hard; diarrhœa increased and characteristic; slight iliac tenderness; deafness; great drowsiness; slept well generally; no delirium; diarrhœa never excessive. Progressed satisfactorily. Recovered 5th October 1877. Treated at first with diaphoretics and quinine, after, diaphoretics cold pack and affusion, nitric acid dilute, plenty of liquid nourishment, milk, &c.; wine from thirty-first day.

From the record of this case in the case-book it appears clear that, as stated in this abstract, the attack began as continued and passed into intermittent. There is nothing to indicate that the disease was of a specific character.

11. *Fox,* aged 20 years, 11 months. A healthy young soldier of five months' residence in India, and up to admission enjoyed good health. On 8th August 1877 came to hospital complaining he had felt out of sorts for two days previously. Had febrile symptoms of an undefined character, with much headache; bowels constipated; tongue white and furred. A few days after admission had congestion of liver, accompanied by dull *pain*; bowels *irregular* till sixteenth day, when characteristic diarrhœa set in and some rose-colored spots became visible; tongue brown and dry; iliac tenderness and tympanitis; temperature ran high, with usual morning and evening alternations, until beginning of sixth week, when it fell to the normal; deafness, stupor and drowsiness, with much delirium at night; incoherent for some days; pulse weak, soft and quick, generally about 120 or over; towards end of the fever meteorism with tenderness over abdomen; irregularity of bowels; and irritability of bladder with very acid urine. A severe case, and made slow recovery, suffering after from intestinal irritation. Treated by diaphoretics, cold pack and sponging, ice, leeches over hepatic region, nitro-muriatic acid drink, bromide of potassium and hydrate of chloral at night, blister to backof neck, tonics, liquid nourishment; stimulants from twenty-third day.

According to the abstract of this case the nature of the attack seems to have been ordinary fever complicated with hepatic congestion. The description of the spots as given is too indefinite to be of diagnostic value.

12. *Walter,* aged 24 years. A strong man; had not had any sickness during previous six months. Deserted early in June; brought back on 9th July 1877 and lodged in guard-room, whence admitted to hospital on 30th idem under the head of febricula. An obscure case at the beginning: at first the fever was of an ardent nature with a daily remission; tongue clean; pulse fair; bowels not affected; no abdominal tenderness till ninteenth day, when temperature rose to 105° and there was pain in the bowels; became very restless at night; and on twenty-second day diarrhœa of light yellow color set in; eruption of rose-colored spots, not numerous; pulse weak and soft; hands tremulous; some deafness; drowsiness and stupor, but no delirium. On twenty-seventh day became much worse and died 2 A.M., twenty-eighth day, from collapse.

Post-mortem showed typical affection of Peyer's glands, some of which were ulcerated; perforation of intestine; 16 ounces fluid in cavity of peritoneum; spleen enlarged but not softened. Treated by diaphoretics, cold pack, nitro-muriatic acid, bromide of potassium and chloral as required at night, poultices to abdomen, liquid nourishment only; stimulants on twenty-fourth day.

The records of temperature according to the case-book and the chart show discrepancies. So far as can be learnt from a meagre record, this case was one of ardent fever.

13. *Girl M. Oliver,* aged 13 years, 9 months; admitted 6th August 1877, died 26th August 1877. A healthy young girl, who had been 4½ years in India, and had enjoyed good health. Admitted with fever of an ardent character with occasional remissions, but without any definite type till thirteenth day, when iliac tenderness and diarrhœa came on. On fourteenth day rose-colored eruption took place; tongue very dark and furred; great stupor and restlessness with delirium; diarrhœa of usual light yellow-colored motions, which were often passed involuntarily; sordes on teeth; pulse very quick and feeble; typhous condition well marked. On twentieth day twitching at corners of the mouth, and death from coma at 6 P.M., twenty-first day. No *post-mortem* examination. *Treatment*: cold pack by means of wet sheet, and ice, diaphoretics, nitro-muriatic acid, blister to back of neck, chloral with bromide of potassium, liquid nourishment, but could with difficulty only be got to take milk; stimulants on eighteenth day.

From the imperfect nature of the record of this case it is impossible to ascertain its precise nature. It present characters of ardent fever.

14. *Girl E. Loose,* aged 8 years, 5 months. A spare, delicate young girl, living in the heavy battery lines, Secunderabad, where there had not previously been any case of enteric either amongst the men or families. Admitted on 18th August 1877 with fever, diarrhœa and abdominal pain, and disease in a few days clearly recognised as enteric. Tongue coated in centre with a brown fur; pulse quick and wiry, 118; great restlessness, stupor, and delirium. On ninth day rose-colored eruption visible; continued high temperature; diarrhœa persistent, but after, condition of bowels became variable, at times constipated; passed blood several times by

bowel, end of fourth week, when abdomen became much distended; pulse quick and feeble ; restlessness increased ; died from coma preceded by convulsions, chiefly of left side, at 6 P.M., 23rd September, on twenty-seventh day. *Treatment :* diaphoretics, cold sponging and affusion, small doses of Dover's powder, bromide of potassium, blister to nape of neck, liquid diet, stimulants as indicated. No *post-mortem* examination.

In the record of this case there is nothing to indicate exposure to recognised causes of enteric fever, nor does the temperature chart correspond with typical charts of this disease. From the history as given in the case-book, the case is more like one of ardent fever terminating in heat apoplexy than anything else.

Cases in 2-16*th Foot.*

15. *Feeling,* aged 22 years ; admitted 1st May 1876 with slight febrile attack. Skin temperature 100° ; face flushed. Diaphoretic mixture, acid drinks, and 6 ounces of port-wine. Next day diarrhœa checked by sulphuric acid and opium. No daily record of the progress of this case in the case-book; only an abstract written apparently after the death of the patient. No eruption, no record of exposure to causes of enteric fever. He died on 4th of May, that is, on fourth day of his illness. The *post-mortem* appearances included enlargement of Peyer's patches, but without ulceration.

The case was clearly one of ardent fever.

16. *Gladwell,* aged 19 years ; admitted 17th July 1876. His condition at the time is unrecorded. On 25th it is stated that in the interval he had high fever with morning and evening remissions, skin temperature ranging from 100 to 104. His treatment consisted of quinine, hydrochloric acid and bark. On 27th had several loose motions yesterday, but none during the night ; gurgling in iliac fossa but no pain ; skin temperature in morning 108. Dover's powder 10 grains, linseed poultice to abdomen. On 29th diarrhœa ; no tympanitis or abdominal tenderness ; skin temperature 100°. To have tinct. opii and sulphuric acid. From this time he gradually recovered and was discharged on September 8th.

As far as any conclusion can be drawn from the record in the case-book, this seems to have been a case of ordinary continued fever.

17. *Fry,* aged 22 years ; admitted 26th July 1876. Headache. On 31st it is stated that he had been delirious and was confused ; that the case had all the appearance of having been caused by exposure to the sun ; tongue dry, glazed ; a tendency to constipation. Had been taking diaphoretics, and quinine in large doses. On 2nd August he was in a very low state ; bronchial râles in both lungs ; temperature 101°. Mist. diaphoretic and blister (position unrecorded), dry cupping to back. On 4th he was improving. On 7th continuing to improve ; had signs of congestion of bases of both lungs. Continued to improve till 15th, when he was attacked with purging. On 16th temperature rose to 101. Had astringents and quinine. On 22nd the purging continued, no record of state of evacuations or abdominal symptoms. On 27th a good deal of iliac pain ; the purging less frequent. To have perchloride of iron. From this time little information is obtainable beyond the fact that he improved, and on the 23rd October was discharged.

Doubtless the case was one of sun or ardent fever. The nature of the diarrhœa is not apparent from the record of the case.

18. *Button,* aged 20 years ; admitted 29th August with diarrhœa On 1st September had pain in iliac region ; tympanitis ; skin temperature 101·6 ; skin dry ; tongue dry and rather brown ; and he was delirium at night. Acid astringent mixture and diaphoretic mixture. On 2nd delirium, low, muttering ; pupils contracted ; clammy sweat. Had quinine 15 grains, astringent mixture ; congestion of base of lungs. On 4th sinking ; purged ; no vomiting. Died at 5 P.M. of 5th.

On *post-mortem* examination agminated glands enlarged ; ulcerated near the ileo-cæcal valve ; further details unobtainable in the case-book.

The records indicate that this was a case of heat apoplexy.

19. *Williams,* aged 19 years ; admitted 1st August 1876 suffering from fever, considered due to exposure to the sun as head symptoms predominated ; subsequently he had simple diarrhœa ; temperature 102. Had quinine and diaphoretics, wine and jelly. Blister to the head, then cold applications. On 7th had improved ; temperature 103 ; suspicious looking spots on abdomen. On afternoon of 9th perspired freely. On 11th very much better ; little or no diarrhœa. From this time recovered, and on 3rd September was discharged to attend hospital.

This was doubtless a case of sun or ardent fever.

20. *Todd,* aged 37 years ; admitted 10th August 1876 with high pyrexia ; temperature 103 ; weak and drowsy ; tongue coated. On 11th these symptoms were increased ; he also suffered from diarrhœa and cough ; slight pain in right iliac fossa. Had quinine, astringents and brandy. On 14th better ; slightly purged ; skin temperature 101·4 ; pulse 80 ; urine scanty, specific gravity 1032. Had iod. potassii 15 grains, astringents, diaphoretics, blister to head, dry cupping (to chest), brandy 4 ounces, port wine 4 ounces. On 16th had been twice moved ; has bronchial sibilant râles in the chest ; respirations 34 ; temperature morning 100·6, evening 102·8 ; urine scanty, specific gravity 1024. To have chlorate of potash, acid drinks, brandy and port wine. From this time he improved. On 24th the state of the lungs had improved considerably ; no

cough or expectoration; skin temperature 101; pulse 99. On 29th had a change for the worse, but only temporarily. Convalescence continued, but after 23rd September no record of the case appears. On 26th October he was discharged.

From the particulars of this case given it is difficult to identify its precise nature. It seems, however, to have been non-specific continued fever complicated with pulmonary symptoms.

21. *Evans*, aged 25 years; admitted 12th August 1876. Skin dry, temperature 102; his manner confused; suffering from diarrhœa. The treatment unrecorded, except that 8 ounces of wine were allowed. On 13th the symptoms had become worse; tongue dry and brown; purging, and pain in the iliac region; upon these indications the case was noted as one of enteric fever, and it is stated that he had been treated with quinine grains 15 morning and evening and diaphoretic mixture. On 14th not going on well; tongue swollen, brown; excessive debility; temperature 101·6, skin dry; mental faculties confused. Ordered diaphoretics, blister to the nape, *plenty* of stimulants and nourishment. On 15th in a most dangerous condition; skin dry, temperature 101·4; tongue coated, dry, almost black. On 16th he died collapsed at 7 P.M.

In the *post-mortem* examination the membranes of the brain were found congested; the lungs, but especially the right, highly congested; Peyer's patches enlarged; so also glands of colon, but no ulceration.

From the record it is difficult to say what was the nature of this case. There is nothing to indicate, however, that it was typhoid fever.

22. *Clifford*, aged 20 years; admitted 21st August 1876. The nature of his attack then recorded as continued fever; face flushed; temperature high; illness considered due to prolonged exposure to high temperature. Treatment: a purgative, quinine, diaphoretics, liquor arsenicalis, beef-tea diet, and 4 ounces of brandy. On 23rd skin temperature in morning 103, evening 102·4. On 24th perspires freely; in other respects no better. Details of an exact nature regarding his case are wanting till 7th September. On that day skin temperature in morning was 101, evening 104; he had slight diarrhœa; stimulants continued, and he had 15 grains of quinine. On 9th low muttering delirium; tongue dry; no purging. On 13th better, although precise details are not given. From this date the improvement advanced, and on 27th October he was discharged.

As stated in the early period of its history, this case was doubtless one of continued heat fever.

23. *Hazleton*, aged 37; admitted on 26th August 1876 suffering from dyspepsia, the result of intemperance. At the time he was feverish, temperature 104; perspiring freely; tongue brown. During the night became violent, as with delirium tremens. Chloral grains 5 injected subcutaneously; hair cut; cold applied to the head; afterwards 15 grains of chloral by the mouth and brandy. On 29th was quiet, but dull and weak; tongue dry, brown; respiration quick; a blister applied to the nape. He became worse and died at 3-15 A.M. on 31st.

In *post-mortem* examination membranes and substance of the brain congested; Peyer's patches enlarged; 8 patches ulcerated.

Appears to me a case of phrenitis, the combined result of drunkenness and heat.

24. *Mann*, aged 22 years; admitted 30th August 1876 suffering from headache, lassitude, flushed face, general feverishness. These symptoms increased; from being constipated he had a purgative, and afterwards suffered from diarrhœa. On 3rd, head much confused; eyes congested; face flushed; skin temperature 102. Head to be shaved; cold applied. Wine allowed; diaphoretics given. The state of the patient seems to have varied till 12th September. On that date it is recorded that the temperature of the skin had at night been 103, skin moist; that the temperature in the morning had gone down to 100. From this time he improved, and on 7th October was discharged.

A case of ordinary climatorial continued fever.

25. *Frimage*, aged 21 years; admitted 31st August 1876 suffering from febrile symptoms of an *obscure* nature. Had large doses of quinine; diaphoretic mixture; and as he had diarrhœa and pain in the (right ?) iliac fossa, Dover's powder and astringent drinks were given. On 11th September it is stated that the fever was running a mild, regular course; skin temperature morning 100, evening 102; tongue moist; slight diarrhœa and pain over the cæcum. From this date convalescence progressed, and on 6th October he was discharged to attend hospital.

This appears to have been a case of ordinary continued fever.

26. *Boon*, aged 24 years; admitted 6th September 1876, died 14th of the same month. No record of the case exists in the case-book presented to me. As far as an opinion may be formed from the statement in the return of cases, this appears to have been one of ardent fever.

27. *Smith*, aged 24 years; admitted 14th September 1876. He had for two days been indisposed. On that date skin temperature was high, skin dry. He had a purgative and afterwards diaphoretic mixture and cold to the head. On 19th was stated not to have been so well, but further details are absent. Had 8 ounces of wine allowed. Medicine continued. On 20th skin temperature 102; he had been delirious; tongue brown, dry; diarrhœa. Carbonate of ammonia added to the previous medicine, 6 ounces of wine and 6 ounces of brandy. On 22nd in a very bad state; skin temperature 103·2; pulse 112, feeble; not much diarrhœa. On 25th, *i.e.*, the eleventh day of the disease, was in a sinking condition and died at 1-45 P.M.

The *post-mortem* examination revealed great vascularity of the vessels and substance of the brain; in ileum, at lower end, several enlarged and ulcerated glands; these, it is stated, did not present the elongated appearance usual in enteric fever; patches of congestion in the large intestine, at some places nearly ulcerated.

A case of ardent fever.

28. *George,* aged 20 years; admitted 20th September 1876 with high fever; temperature of skin 102; tendency to diarrhœa. Had diaphoretics. On the night of 21st was delirious. On 23rd skin temperature 101. Precise details in regard to the general symptoms are wanting. It appears, however, that recovery gradually took place, and that on 19th October he was discharged from hospital to attend.

There is difficulty, in the absence of precise details, to identify the nature of this case. From such as are given it seems to have been simple continued fever.

29. *Bennet,* aged 21 years; admitted on 3rd October 1876 on account of *typhoid fever.* Had been under treatment since 7th July on account of abscess in the rectum and hæmorrhoids. On 27th September it is noted that for some previous days he had a good deal of fever, the evening temperature of skin rising to 104, that of the morning falling to 98, the fever like an attack of ague; the patient accordingly treated with quinine and diaphoretics. On 2nd October much pain in rectum; skin temperature 103·6; great pain in defecation. Treatment continued; a chloral draught given. On 4th October the presence on abdomen of rose-colored *spots* is noted; their other characters unrecorded. On night of 4th was delirious. On 6th tongue brown and dry; very low. On 8th in a precarious condition. On 10th had had some sleep; a shade better; tongue a little moister. On 11th tongue moist; temperature 101·6; three motions in 24 hours; pains in the joints. Had ammonia. On 14th much improved; bed sores had formed, and now a large slough is separating. From this time improved, and on 5th January 1877 was discharged.

The precise nature of the fever in this case is uncertain. There is no reason to believe that it was specific.

30. *MacIlroy,* aged 37 years; admitted 4th October 1876 with symptoms of simple continued fever; skin temperature 100 to 103·8. Had quinine and diaphoretic mixture. On 10th a few pink spots on the abdomen were noted, they having been present since admission; their further nature not stated; other symptoms unchanged. On 11th abdomen a little tympanitic; gurgling in iliac fossa; three evacuations. On 14th had been restless all night and delirious. On 16th skin at times acting; the fever pursuing a mild course. From this time he progressed well till 30th, when a slight relapse took place. On 4th November had great debility with delirium; temperature of skin 103·8. 5th no purging; greatly emaciated. Ordered carbonate of ammonia, cinchona and chloroform. On 8th an improvement is recorded. From this time convalescence advanced. On 8th December he was discharged to attend.

As far as can be gathered from the record, this appears to have been a case of adynamic fever of a non-specific character.

31. *Rodgers,* aged 19 years; admitted 28th September 1876. Said to have been discharged on 3rd of October, but there is a palpable mistake in the record.

There is no report of this case traceable. There is nothing, however, in the abstract as given in the tabular form to indicate that the fever was specific in nature.

32. *Melville,* aged 24 years; admitted 7th October 1876, died on 16th.

No record of the case in the case-books sent to me. From the few particulars given in the tabular form the case appears to have been one of ardent fever.

33. *Douglas,* aged 37 years; admitted 6th January 1877. On 1st he had been exposed a good deal to the sun, and had been ill since then. On admission temperature of skin was 103; he had also acute bronchitis. Treated with diaphoretics, a purgative, and quinine hypodermically injected. On 8th remained in the same condition. Had Warburg's drops; profuse diaphoresis followed. On 11th was reported worse; had a restless night; temperature of skin from 104 last evening had gone down to 102; cough troublesome. The quinine to be continued. On 13th a great deal better. He continued to improve till the 20th, when he was reported not quite so well. From that time his state was not satisfactory. On 30th he became suddenly worse; skin temperature 102; pain in the abdomen; tympanitis; bowels not moved during the previous 24 hours. His condition continued to go from bad to worse, and on 2nd February, at 4-30 A.M., he died.

The *post-mortem* examination revealed extensive inflammation of the peritoneum; the intestines distended with gas and much congested; the whole course of the ileum was much congested, this condition increasing towards the ileo-cæcal valve; in the lower 18 inches of the ileum there were several circular ulcers, one of which, about the size of a six-pence, had given way through the peritoneum; Peyer's patches were unaffected.

This appears to have been a case of ordinary climatorial continued fever from exposure to the sun, with enteritis as a complication.

34. *Lightfoot,* aged 35; admitted on 10th February 1877, suffering from what was at the time noted as simple continued fever; skin temperature 104 on evening of 11th; severe headache and pain in the back; bowels constipated. Had a purgative followed by diaphoretic mixture and quinine, leeches to the temples. Diarrhœa followed the purge. On 16th there

was pain over the cæcum; the febrile symptoms diminished. Had a blister over the cæcum and a linseed poultice to the abdomen, and 5 grains of Dover's powder three times a day. On 18th not quite so well: skin temperature 102; three motions in 24 hours; slight pain in iliac region. On 19th some spots on the trunk, described on the 17th as dusky, had become more distinct and assumed the appearance of typhoid eruption; pain continues in the cæcum; abdomen soft; no tympanitis. On 20th the patient had a bad night; was delirious; skin temperature had been 103·8, but in morning was 99·6; sloughing at several points of the blistered surface. The saline mixture and Dover's powder to be continued. From this date till 26th his condition varied. On that date he was very much better; skin acting freely. On 14th March a slight relapse occurred; it was only temporary, however, and he again improved in all respects, except that the evening temperature of the skin kept high. The progress was slow, and at times uncertain; he fell back in condition from time to time, but upon the whole convalesced, and on the 15th of April was discharged from hospital.

This case appears to have been one of climatorial continued fever going on to an adynamic state.

35. *Barrett*, aged 19; admitted 26th April 1877 in a state of high fever; skin temperature 102; severe frontal headache. Had diaphoretic mixture with carbonate of ammonia, cold to the head. The condition of the patient remained without any remarkable indication until 21st May, the treatment meantime consisting of diaphoretics; the diet beef-tea, and 4 ounces of wine as extras. On that day it is recorded that the variations had for some time been considerable in the temperature of the skin, that is, the disease assumed a remittent type. The treatment now consisted of saline mixture and a little Glauber's salts. On 23rd does not improve; therefore remains on wine; bowels inactive. On 24th is worse; temperature of skin 103·4; wet sheet packing for 15 or 20 minutes. On 25th the report states that he had been delirious; the packing did not reduce the temperature; head shaved, cold applied, wine increased. On 27th seemed a little better; the temperature 103. On 28th his condition very serious; spots of doubtful character on the abdomen. On 30th a slight improvement. On 1st June spots less distinct; increased debility; skin temperature 102 to 103·8; abdomen tympanitic; bowels moved once in 24 hours. On the night of 5th skin temperature rose to 105, going down on 7th to 99. On 9th had decidedly improved; had quinine in 5 grain doses. From this time convalescence began and advanced slowly, he being discharged on 24th July.

The nature of the disease in this case seems to have been remittent fever.

36. *Bourne*, aged 22; admitted 29th April 1877.

No record of this case occurs in the books submitted except the few particulars related in the return annexed. They leave the precise nature of the disease uncertain.

37. *Rowden*, aged 20; admitted on 6th May 1877 suffering from giddiness and weakness; skin temperature 103. Treated with diaphoretics and Warburg's drops. On 10th no better; subcutaneous injection of quinine; tongue was dry; slight diarrhœa. On 12th he having been better, on 11th became worse; skin temperature 104; diarrhœa. Had Dover's powder. On 13th is very low; delirious; very much purged; skin temperature 104; no pain. Had poultices to abdomen, astringent mixture, and starch and opium enema, Dover's powder, wine. From this date the general progress of the case was downwards, with an occasional shade of improvement; he became more and more feeble, sank and died on 20th May at 1-30 A.M.

The *post-mortem* examination revealed congestion and tumefaction of ileum and its glands and of the large intestine.

Obviously a case of ardent fever passing into typhoid state.

38. *Holbrook*, aged 21; admitted 1st August 1877 suffering from general pyrexia; high temperature; diarrhœa. Had saline mixture every hour, cold to the head. Was delirious during the night of 2nd. On 3rd drowsy; pulse quick, feeble. Ordered ammonia, sulphuric æther, and senega. On 5th skin temperature at 7 A.M. 104, at 5 P.M. 103·4; had been quieter; slept at intervals; pulse compressible. To continue stimulating treatment. On 6th had turpentine in small doses; his breathing hurried; sputa viscid and tinged with blood. During the night of the 7th was very delirious. On morning of 8th had an enema of turpentine and castor-oil, afterwards acetate of lead and opium, and in the evening chloral and water. On the 9th the record states that he had passed a very bad night, and that he died at 7 A.M.

The *post-mortem* examination revealed congestion of membranes and substance of the brain; congestion of both lungs; congestion, but no ulceration of solitary and aggregated glands of small intestine.

The history of this case points to ardent fever passing into heat apoplexy.

39. *Bray*, aged 21 years; admitted 12th August 1877 with high temperature; skin dry; feeling generally unwell; bowels natural; tongue coated. Had quinine in large doses and hypodermically, and diaphoretic mixture. On 15th the symptoms had rather increased than decreased. On 16th no improvement. Had 20 grains of chloral and Warburg's drops; other treatment to be omitted. Profuse perspiration followed. During the next ten days the state of the patient oscillated, at one time favorable, at another the severity of symptoms increasing. On 27th October an improvement is recorded; had been purged, the evacuations containing slight traces of blood. Convalescence was slow, and on 3rd December he was discharged to attend hospital.

As far as can be gathered from the record, the case was one of endemic fever, adynamic in type and non-specific in nature.

40. *Bullis*, aged 28 years; admitted 22nd October 1877, died on 3rd November 1877. No record of this case is available beyond what occurs in the return attached. From it the nature of the disease is uncertain.

With reference to the cases above detailed, the following transcript from the Annual Report on 2-16th Foot for 1876 has an important significance, namely:—

"Enteric fever prevailed during the months of July, August, September and October. There were 17 admissions and 7 deaths. I am inclined to think that many of these cases were severe forms of remittent fever and not enteric, although the *post-mortem* examinations revealed ulceration and infiltration of Peyer's patches for the following reasons, viz.:—

1st. The rapidity with which death took place.

2nd. The absence in many of the usual rose-colored eruption and diarrhœa; in some there was obstinate constipation.

3rd. Head affections being early and prominent, symptoms more resembling the condition of a man suffering from sunstroke."

This being so, it does not seem very clear why the Medical Officer recorded the cases alluded to under the head of enteric fever.

In the 12th Lancers no case of enteric fever occurred. In the 44th Foot 15 cases of the disease, 8 fatal, are reported to have occurred between March 1876 and December 1877. The regiment having left Secunderabad for Burmah before I had an opportunity of personally inquiring, on the spot, into the history of the cases as recorded in the hospital case-books, I prefer omitting further observations concerning them.

I have carefully gone over the records of the cases just given, and thus summarise my views regarding them, following the order in which the abstracts occur, viz.:—No. 1 was ardent fever passing into heat apoplexy; 2, uncertain, but non-specific; 3, endemic, non-specific; 4, ardent fever from direct exposure; 5, irregular remittent, non-specific; 6, uncertain, but not enteric; 7, febricula; 8, ardent fever; 9, ardent fever; 10, continued fever passing into intermittent; 11, continued fever with hepatic congestion; 12, ardent fever; 13, uncertain; 14, ardent fever, ending in heat apoplexy; 15, ardent fever; 16, ordinary continued fever; 17, ardent fever; 18, heat apoplexy; 19, ardent fever; 20, uncertain, except that it was non-specific; 21, uncertain, except that it was non-specific; 22, heat fever; 23, phrenitis from heat and drink; 24, climatorial continued fever; 25, climatorial continued fever; 26, ardent fever; 27, ardent fever; 28, continued fever, non-specific; 29, uncertain, except that it was non-specific; 30, adynamic fever, non-specific; 31, insufficiently recorded, but nothing in the abstract to indicate specific fever; 32, insufficiently recorded, but nothing in the abstract to indicate specific fever; 33, climatorial continued fever, with "bowel complication"; 34, climatorial fever, becoming adynamic; 35, remittent fever; 36, no record in the case-book, the nature of the case uncertain; 37, ardent fever, passing into a typhoid or adynamic state; 38, ardent fever, passing into heat apoplexy; 39, endemic adynamic fever, non-specific; 40, insufficiently reported for identification. Thus of all the forms of disease here recorded, there is absolutely not one that comes up to the standard of specific enteric fever as laid down by recognised authors. The suitability or otherwise of the methods of treatment employed in some of the so-called cases of typhoid fever will become apparent when reference is made to the typical cases of endemic fevers already given in this report.

KAMPTEE.

Average annual strength of the British Forces at this station—

Officers	34
Men	869
Women	154
Children	227

26. No information of a precise description is now available with regard to the prevalence at Kamptee of the disease I am at present investigating. The following is all I can find, namely:—

1. *Camp*, Royal Artillery, aged 24; admitted 27th June 1875. His disease noted simply as fever; his symptoms, slightly feverish. A purgative and diaphoretic mixture. Nausea and

sleeplessness for some days. On 30th June 40 grains of chloral with very little result; beef-tea, brandy 3 ounces, chicken broth, milk, arrowroot, lime juice. On July 1st slightly delirious. On 2nd fever high. Ordered m. 10 of iodine three times a day; bowels moved naturally; no pain or gurgling in the iliac fossa. Brandy 8 ounces. On 3rd high fever; delirium rather violent; no pain, gurgling or spots; the disease changed to enteric fever, but no reason assigned. On the evening of that day the iodine seems to have been omitted; tincture of aconite m. 5 every four hours; an enema administered. The delirium increased in violence, and was very violent up to his death, which happened at 4-45 A.M. on 4th.

Post-mortem examination showed vessels of brain highly congested; duodenum slightly congested; a few minute ulcers along the inner surface of the ileum; marks of old ulceration in Peyer's patches; large intestine healthy.

Evidently a case of heat apoplexy, treated by an inexperienced Medical Officer. It presents a sad example of the natural results of such inexperience, added to a seeking after a specific disease with which that of the patient had no alliance.

Mary Ann Schofield, 33rd Regiment, aged 27; admitted into hospital 4th January 1876, died 18th January 1876. This woman, the wife of a Private of the 33rd Regiment, had been some time under treatment for dyspepsia in quarters, but no improvement in her condition appearing, she was admitted into hospital on the above date with all the symptoms of gastric and bowel irritation; foul breath and tongue; retching and diarrhœa. For two days she continued much in the same condition, with some degree of fever of a continued type which remained persistent throughout the case. On the 8th the diarrhœa, which has been very severe and of a bilious character, without the slightest trace of hæmorrhage, ceased, though pain upon pressure and irritability of stomach remained a very marked symptom. On the 11th the incessant retching and vomiting subsided, but only to return the following day, together with some looseness of the bowels, the motions being of a greenish color but without blood. On the 15th an eruption recorded in the case-book as "red-colored maculæ, somewhat like the spots of typhus" appeared (though I could not verify the same on personal examination the day following), and from this time the patient's symptoms increased in severity; she became delirious and very prostrate; and thus sinking, died at 11 A.M. on the 18th January.

This case had been returned as "simple continued fever" on admission, and this had been retained until, under instructions received, the nomenclature was changed after death to the above heading. The patient had been but one month in the country at the time of attack, and had not suffered previously from ague or other periodic disease, at which date also neither ague nor other malarial disease prevailed in the locality.

No *post-mortem* examination was made at the husband's desire.

The great feature of this case, as opposing the diagnosis of "enteric fever," was the absence of the least trace of blood in the stools, though carefully looked for; there was great pain, increased on pressure, over the intestinal tract, though much more marked over the region of stomach, where it was most severe on the slightest palpation, and would have led one to infer that lesion of the bowels was considerable over a large portion of the intestinal canal; but there was never any hæmorrhage to substantiate the supposition.

The above remarks are by the Medical Officer who treated the case, viz., Surgeon-Major Clifton, A.M.D. The case was clearly one of endemic non-specific continued fever; notwithstanding the fact alluded to that instructions to record it as one of enteric fever emanated from my office. I believe now this was done in error.

Remarks.—Of these two cases it needs now only to be further observed that one was of heat apoplexy, the other of non-specific continued fever.

CASES AT CANNANORE.

Average annual strength of British Troops at this station—

Officers	15·89
Men	590·15
Women	71·20
Children	130

27. According to reports to which I have had access, the history of so-called enteric fever among troops at Cannanore dates back to the year 1862; at that time the garrison consisted of the 66th Foot and a battery of Royal Artillery, the former having landed at the station direct from Ireland in December 1857. In 1864 one case occurred in the 102nd Foot, which had succeeded the 66th Foot; and in 1865 four cases are recorded, one of which fatal. In February 1867 the 1st Royals arrived at Cannanore, where they remained till October 1870, proceeding then to embark for England. During 1866 and 1867 no case of the disease appears to have occurred at the station; in 1868 one case was treated successfully, and in 1869 one case, which ended fatally.

On 19th November 1870 the 89th Foot landed from England; during that year four cases are reported in the regiment, without a death. On that occasion, according to the report by Surgeon-General Massy, C.B., the first case occurred on 12th December, and simultaneously with the prevalence of enteric fever at Cannanore several cases of remittent fever were reported in the detachment at Malliapooram; of these two were fatal, and the *post-mortem* appearances were those of enteric fever: similarly, among the detachment at Calicut, two deaths were recorded from enteric fever. In explanation of these occurrences it is noted by Dr. Massy that on the arrival of the 89th Regiment its ranks included 341 lads under 20 years of age, and 249 between 20 and 25.

In 1871 there are said to have been 12 admissions and 4 deaths by enteric fever; in 1872, 2 admissions with 1 death in the above regiment. On the 2nd November of that year the 43rd Light Infantry landed at Cannanore from Cork, three cases of simple continued fever having occurred during the voyage. On 20th December the first case noted as enteric fever occurred. At this time the regiment consisted of 726 men, 76 women, and 82 children. Of the men 84 were under 20 years of age, 378 between 20 and 22, and 80 were recruits not dismissed drill; soon after disembarkation bowel complaints became prevalent; during November and December 65 men were admitted for diarrhœa, and nearly a hundred more treated out of hospital for the same disease.

Enteric fever was said to be confined to the 43rd Regiment, no case of the disease having occurred in the garrison battery of Artillery at Cannanore, composed of older and more acclimatized men, whose barracks were in a better sanitary condition than those of 43rd Regiment. Water at this station cannot be associated as a cause of enteric fever; it is obtained from wells, filters through a ferruginous soil, and is very pure.

From the report by Dr. Cornish, we learn that the cases of fever witnessed among the natives of Cannanore before and during the prevalence of enteric fever in the 43rd Regiment, were the ordinary malarious forms of intermittent type common there and on the West Coast generally during the land winds of the north-east monsoon. Dr. Cornish saw in the Garrison Hospital several patients with fever of this description; and as regards the population of the cantonment generally and the old town of Cannanore, his inquiries failed to elicit any facts regarding the prevalence of typhoid fever. The disease had been confined entirely to the men occupying the Infantry barracks; the inhabitants of the married peoples' quarters of the 43rd, the officers and families, the battery of Artillery at Cannanore, the detachments of the 43rd at Calicut and Malliapooram had no fever of this description. The Medical Officer of the 43rd, Surgeon-Major Johnston, observed that no history of contagion, or of the existence of any case of typhoid external to the regiment, can be determined; every part of the men's barracks has contributed at least one case. Exposure to the land wind which blows over lagoons and swampy land, to which the natives attribute the fever (not enteric, according to Dr. Johnston), a faulty system of conservancy, the neighborhood of the filthy village of Barnacherry, are the most obvious causes of the disease.

Dr. Cornish observes that whereas the country around Cannanore is well wooded, the barracks stand out here and are destitute of protection from the glare of the sun. The custom of the natives is to erect their houses under the shade of trees, doubtless because experience has taught them that such a practice is beneficial. (It is acknowledged as a fact that trees destroy malarious influences). According to Dr. Massy the climate of Cannanore is a trying one, producing an enervating effect upon persons who reside at the place a year or two, even if they escape actual disease. The temperature seldom exceeds 90° F. or falls below 70° F.; the seasons are only two, viz., the dry and that of the monsoon, the former lasting from June till October, the latter the other months. During the period of the monsoon a sea-breeze from south-west prevails during the day, a land wind at night, considered not to be healthy. The natives of Cannanore suffer chiefly from bowel affections and remittent fever; cholera has sometimes prevailed with virulence among them, but intermittent and enteric fevers are almost unknown among them. Cholera and intermittent fever are very rare among British troops there, but not so dysentery, hepatic diseases, and continued fevers. During the occurrence of enteric fever in

the 43rd Light Infantry none of the married soldiers or their families suffered from enteric fever, although, as observed by the Surgeon of the regiment, their barracks were quite as freely exposed to emanations from the privies as were the barracks of the single men. It is said that in the latter a fæcal odour was perceptible all day. Except in 1858 and 1859, when there were 128 and 134 admissions respectively for continued fever, sickness and mortality among the troops at Cannanore have been small.

Having extracted the above particulars, I proceed to give the following notes from case-books of cases said to have been of enteric fever in 43rd Regiment at Cannanore in 1872-73.

1. *Sutton,* aged 32; admitted 20th December 1872. Had shortly before suffered from dysentery. On admission the symptoms were those of that disease. The tendency of the remarks in case-book is to pass over the dysenteric symptoms, although there is no record of exposure to any of the specific causes of the latter disease, and to seek for those of enteric fever; enteric eruption thinly scattered over abdomen, gurgling in right iliac region, and muttering delirium followed; was semi-comatose; temperature of body high. On sixth day after admission he voided a clot of blood per anum; the sinking that had previously set in increased, and he died.

Post-mortem examination revealed congestion of the liver, opacity of its capsule; colon and rectum congested, the rectum containing coagula.

Climatorial fever, complicated with hepatitis and dysentery.

2. *George,* aged 21; admitted 21st December 1872. On admission had very severe pyrexial symptoms. Had been ill two days before admission, the attack coming on with shiverings. On sixth day of illness skin pungent, hot; diarrhœa; abdominal tenderness. On ninth day "suspicious" spots. On eleventh day the evening temperature of body lower than in the morning, the exact variations not noted. On twelfth day abundant maculæ. On fourteenth pain in chest. On the sixteenth bowels confined; no abdominal pain. On twenty-third the spots passing into petechiæ; doubtful.

Climatorial ardent fever.

3. *Addison,* aged 19; admitted 23rd December 1872. Prior to illness was employed in the Regimental mineral water-house. Admitted with high fever; severe abdominal griping pains. Profusely purged and stools bloody. These symptoms had been coming on during the three preceding days. Treated with *chlorate of potash* and *Dover's powder,* afterwards tincture catechu. Stools liquid, not bloody, shreddy, offensive. On 26th December skin cooler than in the morning. On 27th no spots; wandering. Ordered ipecac. grains 3, opii grain ¼ every three hours. From this time sank till his death.

Post-mortem examination. Ulceration of Peyer's glands and of ileum close to the cæcal valve; large intestine very much congested.

Climatorial fever and enteritis, non-specific. The treatment in early stages not such as would formerly have been used.

4. *Dolphin,* aged 20; admitted 28th December. On admission suffered from pyrexia; no abdominal pain; had suffusion of eyes and headache; no diarrhœa. Had ipecac, grains 3, opium grain ¼, hydr. c. creta grains 2. On fourth day of attack epistaxis; skin hot; tongue moist and creamy; evening temperature 105° F.; abdomen tympanitic; no maculæ. On sixth day bowels constipated. On seventh skin pungent, hot. On seventh day headache; pain in abdomen; diarrhœa; iliac gurgling. On eighth day temperature of skin in morning 104° F., evening 105° F.; heat pungent; drowsy. Eleventh day temperature 102° F.; spots not previously mentioned on abdomen said to be fading. Thirteenth day spots cannot be determined. On sixteenth day morning temperature 101° F., evening temperature 104·2° F.; improving. Convalescent from this date.

Nothing to show that this was other than ordinary climatorial ardent fever.

5. *Connars,* aged 20; admitted 30th December. When admitted had great pyrexia; heat of skin and headache; diarrhœa some days previously. No abdominal pain noted. He had an opiate followed by 20 grains of ipecac. Skin temperature 103° F. Stated to have had epistaxis before admission. After the ipecacuan had pain in abdomen. On fourth day after admission suffered from vivacious delirium; had no pain; bowels confined; lenticular spots visible; temperature of skin in evening 105° F. On fifth day spots very numerous, their exact characters unrecorded. Sixth no pain; sudamina with the spots; iliac gurgling; morning temperature 103·8° F., evening 104·7; intellect obscure. Had beef-tea, brandy and milk by rectum; any other treatment is unrecorded. On eighth day *rose rash* on abdomen; sinking; fed by rectum; evacuations passed unconsciously. Continued to sink, and died on morning of the eleventh day. No record exists of treatment beyond that above stated.

On *post-mortem* examination upper part of large intestine much congested; rectum pale; no ulceration in colon or ileum.

A case of ordinary malarial fever.

6. *Aird,* aged 19. On 20th December 1872 was admitted with febricula; recovered and was discharged. On 1st January 1873 admitted with pyrexia; malaise; no abdominal pain or diarrhœa. Had diaphoretics, then large doses of ipecacuan, the indication for which not apparent; skin temperature 101 and 103. On third day pulse 52; on sixth day 48; no pain; tongue clean. On ninth day skin temperature 98·8; no spots; no pain; bowels natural. On sixteenth day sent out, but to attend.

Simple climatic fever (febricula).

7. *Monck,* aged 24. On 18th December 1872 admitted with slight pyrexia; torpid bowels; inability to sleep. For eleven days his head had been "queer" by his own account. Had 1 drachm tinct. hyoscyam at bed-time and 5 grains of calomel in the morning. On fifteenth day of illness skin cool; pulse normal; still complains of head; insomnia. Had a blister to the nape; morphia at bed-time, then pil. hydrarg. and pil. rhei co. On nineteenth day very feverish; skin hot and pungent; eyes suffused; tremour of limbs; tongue furred. Had muriatic acid to drink and pulv. dover at bed-time. On twenty-first great pyrexia and excited nervous system; tenderness of abdomen; bowels torpid; delirious. Had ipecac. grains 3 and opium grain $\frac{1}{4}$ every three hours, and wine every two hours. On twenty-third day temperature morning 104, and tingling; pupils dilated; pulse weak; in evening temperature 106°; picking bed-clothes; very excited; articulation indistinct; skin dry; tinged. Sank and died on morning of twenty-fourth day.

Post-mortem. Brain healthy; pia mater congested; aggregated glands and lower part of ileum ulcerated; large intestine and rectum much congested.

Ardent fever with cerebral determination.

8. *Hall,* aged 21; admitted on 25th December with great headache and pungent heat of skin, having felt headache and been ill four days, with occasional chills. He had on admission abdominal tenderness; gurgling in iliac fossa; no eruption, but skin of abdomen dusky. On sixth day of illness bowels loose. The treatment recorded consisted of lemonade to drink, ipecac. grains 3, opium grain $\frac{1}{4}$ every three hours. On seventh day in a low state; great headache and thirst; skin hot and dry. Medicine continued, with muriatic acid drink; skin temperature morning 103°, evening 103°; bowels loose. On eighth day temperature of skin 105°; no maculæ over abdomen, but skin then dusky. Continue ipecac. and opium and brandy. On tenth day bowels very loose. To have catechu, logwood and opium. Skin temperature morning 102°, evening 105°. On eleventh day felt better; no delirium; bowels still loose, dejections coffee-colored; *lenticular spots* doubtful; abdominal tenderness absent. On twelfth day cough; mucous rales; lenticular spots on left side of abdomen. On thirteenth day sensorium undisturbed; had slept; slight iliac gurgling; tongue cleaning. On fourteenth day skin pungent; pulse 92; morning temperature 103·8, evening 104; sleepless and restless. Omit previous medicine; give 2 grains of chloral. On fifteenth no spots; loud mucous rales. Mustard poultice to chest, tincture camph. co. m. 12, vin. opii m. 5 every three hours. On nineteenth day skin moist. On twenty-first day skin temperature morning 98·8, evening 100. From this time improved. On forty-seventh day was sent to Wellington.

Nothing specific in this case; seems to have been one of ordinary adynamic fever of India.

9. *Jones,* aged 23; admitted 27th December. Had been ill one day; skin pungently hot; bowels loose; iliac pain; skin temperature 103. Had an ipecacuan emetic, turpentine to abdomen, then fomentations. Pulv. opii hyd. c. creta, pulv. ipecac every three hours. On the third day of illness some headache; tongue enlarged; headache severe; skin pungent. On fourth day headache less; temperature of skin 102; placed in a tent; slept a little. On fifth tongue soft, brown; pain in abdomen. Records of case do not clearly indicate whether they refer to morning or evening. On seventh day very ill; tongue dry, nearly black; skin temperature morning 102, evening 103; cerebrum disturbed; no tympanitis; abdominal pain; *lenticular spots* on abdomen; iliac gurgling. Eighth day lips covered with sordes; skin temperature morning 101, evening 103; no pain; bowels slightly relaxed; is sinking. On eleventh purged every half hour; lenticular spots well marked; no gurgling; unable to swallow; *fed* entirely by the rectum; likes his beer (it does not appear how it is taken). On twelfth some chance of his recovery appeared; skin temperature morning 100·8, evening 101·8; bowels much relaxed. On sixteenth day tongue cleaning; vomits everything; skin temperature morning 101, evening 101·4; pulse 80. On twenty-first day temperature of skin 101·2; expresses himself as better. On 24th convalescence had advanced considerably; had much pain in legs. On forty-sixth day had improved sufficiently to be sent to Wellington.

Except the presence of lenticular spots, there appears nothing specific in this case. Are they distinctive of specific disease? The case seems one of continued climatorial fever becoming *typhoid* or adynamic.

10. *Button,* aged 21; admitted 27th December 1872 with pyrexia and diarrhœa for *several* days before; pungency of skin; slight pain in abdomen; diaphoresis. To have compress on abdomen, ipecac as an emetic, then in doses of grains 20 *twice* a day. Skin temperature morning 100; sensorium undisturbed. On eighth day pulse 56; skin temperature morning 98·2, evening 98; abdominal pain; no spots; diarrhœa; no gurgling. On tenth day pulse 52; skin temperature morning 96, evening 98. On twelfth felt better; skin cool; tongue clean; bowels moved

thrice in 24 hours; no spots. From this time improved, and on twenty-seventh day was discharged.

Clearly a case of ordinary diarrhœa with slight fever.

11. *Felton*, aged 20; admitted on 29th December. Ill four days with diarrhœa and some pyrexia. Had castor-oil and opium, then chalk mixture with catechu. On admission skin pungent, temperature 103°; tongue creamy, red at tip; iliac pain; much headache; in evening profuse epistaxis; skin temperature 105°. On sixth day no gurgling; tongue moist and coated, red at tip and edges; some suspicious spots on abdomen. On seventh day epistaxis; tenderness in iliac fossa. To have brandy ½ an ounce every two hours. On eighth day skin pungent, 103; epistaxis; about 20 lenticular spots on abdomen. On ninth much epistaxis; skin pungent; temperature morning 103, evening 104; bowels confined; no abdominal pain; spots fading. On eleventh day voided blood by stools; spots still visible; skin temperature 103 in morning, in evening 108. Omit astringent medicine, give chlorate of potash drink. On twelfth day great weakness; spots well marked; expectorates small quantities of blood; not much diarrhœa. On fourteenth bowels constipated; spots uncertain. On seventeenth, dry skin, temperature morning 103·4, evening 104; dullness of mind; spots uncertain; slight diarrhœa; slight epistaxis. On twenty-second day bronchitis; pain on forced inspiration; skin temperature morning 100·8, evening 102. On twenty-fourth day subacute pneumonia. To have carb. ammonia and tin. camph. co. every four hours. On thirty-second day had improved; chest symptoms declining. On forty-fifth day passed some blood; purged twelve times in 24 hours; feels very low. To have ipecac. and quinine twice daily. On forty-seventh day moved six times and voided blood. On forty-eighth day improved. On sixty-first day the improvement had continued; slight diarrhœa. On seventy-eighth day he had so far recovered as to leave the hospital to attend daily: bowels then relaxed.

This appears to have been a case of "typhoid or enteric fever" as described in books; its origin non-specific; therefore climatorial.

12. *Charter*, aged 21; admitted 26th December. Pyrexia without abdominal pain or diarrhœa; headache; thirst; tongue red; pulse 108. To take calomel followed by saline draughts. Period ill unrecorded. On 27th skin temperature 103· On 28th relieved; headache less; surface cool. On 29th skin very hot; abdominal pains; great thirst; evening temperature 104. On 30th skin cooler, temperature 101 morning and evening. On 3rd January 1873 bowels unmoved; no abdominal pain; had an enema of sulph. of magnesia; one lenticular spot; no gurgling; skin temperature morning 98, evening 101. To have chlorate of potash drink. On 7th skin temperature morning 97, evening 100·8; tongue clean; bowels still confined; two spots visible; no pain; is improving. From this time improved, and on twenty-first day was discharged to attend hospital.

A case of climatorial fever passing from remittent to continued.

13. *Barnett*, aged 24; admitted 25th December. Pain in abdomen; pyrexia; diarrhœa, its character unrecorded. Had ipecac. grains 5 with opium grain ¼. On 1st January 1873 skin moist; temperature morning 98, evening 97; tongue clean; pulse 100. This is said to have been fifteenth day of illness. Record of case is unprecise in essential particulars. On seventeenth day headache; maculæ undetermined; skin temperature morning 98, evening 99·5. On eighteenth pain in abdomen; iliac tenderness; bowels moved twice a day, evacuations yellow; rose-colored *tint* over abdomen. On twenty-second day spots (not before recorded) fading. The record of the case again unprecise. On twenty-eighth day not so well; abdominal pain. Had sinapism with pulv. dover grains 5 and pulv. ipecac. grains 2. On twenty-ninth relieved; from then continued to improve. On fifty-seventh day sent to Wellington.

The case, *atonic diarrhœa*. The highest skin temperature recorded was 100° F.

14. *Ecclestone*, aged 20; admitted 30th December 1872. Pain in abdomen; no diarrhœa. January 2nd, 1873, pyrexia; diarrhœa; increased abdominal pain; skin cool; temperature morning 100, evening 99; dejections yellow; pulse 64. 3rd doubts as to nature of certain spots on abdomen. 4th pulse 48; temperature 97·6 in morning, 56 and 97·8 in evening; tenderness of abdomen; spots numerous and well marked; temperature morning 98·6, evening 98·2; bowels moved twice in 24 hours; spots well marked; no gurgling; tongue clean. On 7th convalescent; continued to improve, and on 14th was discharged from hospital as convalescent.

A case of diarrhœa.

15. *Gammon*, aged 23; admitted 4th January 1873. Ill three or four days; rigors; headache; bowels normal; skin cool; temperature morning 98, evening 99·8; pulse 78; no pain in abdomen recorded. Had castor-oil enema, turpentine to abdomen, then spongio-piline. On 5th bowels moved three times, dejections *formed*; skin cool; spots undetermined; slight abdominal tenderness. On 7th pulse 50; skin temperature 98; tongue cleaning; no abdominal pain; no spots; much frontal headache of neuralgic character. On 8th headache; peculiar roseolar rash on chest; condition favorable. On 9th better. From this continued to improve, and was discharged on 16th.

The case so imperfectly recorded, that nothing definite can be made of it, except that it was *not* one of enteric fever.

16. *Sevenoakes*, aged 25; admitted 4th January. Had been poorly four days with diarrhœa and nausea. Temperature morning 103, evening 104; no abdominal pain. To have Dover's

powder, turpentine and spongio-piline to abdomen. In evening epistaxis. In one part of record said to have been ill about *six* days. On 6th tongue black, dry and rough; bowels moved three times; no tenderness; skin temperature morning 101·4, evening 104. On 7th slight pain in abdomen; spots well marked. 6 grains of Dover's powder twice a day. On 8th mind wandering; skin temperature morning 102·8, evening 105; pulse 104; pupils contracted. On 9th spots fading; bowels moved three times. On 13th better; tongue cleaner; pulse 84; skin temperature morning 100·2, evening 101. From this date improved, and was on 12th February 1873 sent to Wellington.

The record of this case is indefinite, and even in part *mixed up* with that of Private Gammon. Nothing to show what its nature actually was, but certainly it was not enteric.

17. *Gordon*, aged 27; admitted 4th January 1873. Ill three days with anorexia; nausea; pain in abdomen; pulse 84; temperature morning 98·8, evening 100·2; pyrexia inconsiderable; bowels much relaxed, but only moved twice a day. On 7th the record states that he was improved in every respect; pulse calm; a good deal of languor. From this date he improved. No further details of the case occur. On 16th he was discharged to attend hospital.

A case of diarrhœa.

18. *Davis*, aged; 23 admitted 6th January 1873. Ill four days; slight pyrexia; tongue coated, tremulous; skin pungent; pulse 100; skin temperature morning 102, evening 99·6 pain at umbilicus. On 7th bowels moved once in 24 hours; spots not detected; frontal headache; skin hot, temperature 103·6. On 8th bowels moved twice; a few indefinite spots fading on chest; skin temperature morning 101·8, evening 102·4. 11th bowels loose; abdominal pain; tongue coated; skin hot; temperature morning 100, evening 103; face anxious; mind clear. To have starch and opium in enema, continue fomentations, 2 grains of ipecac. and 5 grains of Dover's powder thrice a day. On 13th slightly purged; some pain *about* abdomen; sleeplessness. On 15th progressing favorably; still some pain; skin temperature morning 99, evening 102. From this date improved. On 16th perspired freely. On 23rd the temperature was morning 100·2, evening 101·6. On 11th February was sent to Wellington.

Appears to have been a case of simple continued fever, non-specific.

19. *Lovegrove*, aged 25; admitted 25th January 1873. Ill one day; has shivering; malaise; bowels open; tongue furred. To have ipecac. grains 30 with diaphoretic mixture. On 26th headache; tenderness in abdomen; gurgling in right iliac fossa; skin temperature morning 102·6, evening 103; skin not very hot; no maculæ. On 28th gurgling; no *spots*; *great* abdominal tenderness; headache severe; tongue moist, coated; temperature morning 103, evening 104·4; pulse 76 and 82. On 31st bowels loose; abdomen very tender; tongue dry and thickly coated; skin temperature morning 103·4, evening 105; pulse 76 and 84. On February 1st easier; headache gone; gurgling in right iliac fossa. Had 20 grains of ipecac and 20 of bicarbonate of soda twice in past 24 hours; temperature morning 103, evening 106·6; pulse 84 and 90. On 2nd worse; drowsy; bowels confined. On 3rd four or five lenticular spots on abdomen. On 5th worse; tongue dry and brown; maculæ visible. On 6th very drowsy; mind obscured; abdomen tender and tympanitic; spots not visible; bowels loose. To have *ipecac.* enemata, port-wine instead of brandy; skin temperature morning 103·8, evening 103·2. On 8th better; head clearer; tongue moister; no tenderness in iliac fossa; spots not visible; skin temperature morning 103·6, evening 103. From this date gradually improved. On 10th March discharged to attend.

Presents the character of *malarial fever.*

20. *Hackett*, aged 23; admitted 24th January 1873. Malaise; headache; nausea; chilliness. Had calomel grains 3, then a saline purge and diaphoretic mixture. On 25th headache; pulse quick and strong; pain in right iliac fossa; bowels not loose; temperature morning 103·4, evening 104; breathing oppressed. Had 40 grains ipecac. and 20 grains bicarbonate of soda. On 26th abdominal pain most severe in right side. On 30th abdomen tympanitic; no maculæ; temperature morning 103·8, evening 105·6. On February 1st no spots; abdomen tender; bowels not loose; no sordes; tongue moist, white. On 4th better; no abdominal tenderness; no maculæ; bowels relaxed; skin temperature morning 102, evening 103·6; skin moist. On 8th temperature and pulse nearly normal. From this time he slowly improved, and on 27th February was discharged to attend.

The case appears from an imperfect record to have been one of non-specific continued fever with abdominal determination.

21. *Duplin*, aged 27; admitted 27th January 1873. A hospital orderly; very feverish; some headache; temperature 102·2; abdominal tenderness; ipecac. grains 40, bicarbonate of soda grains 20. 29th headache severe; bowels confined; tenderness over whole abdomen; very feverish; temperature morning 103·4, evening 103·6; pulse 92 to 104. February 1st still very hot; gurgling in right iliac fossa; tongue coated, white, dry; skin temperature morning 104, evening 105·8; has had 20 grains ipecac. night and morning. On 3rd in afternoon epistaxis with relief to restlessness and feverishness; skin temperature morning 104·2, evening 105. On 5th worse; mind obscured; tongue dry, coated; more epistaxis last night; skin temperature morning 103, evening 105. On 6th wandering; low; bowels loose; no tenderness or gurgling. On 8th, that is, thirteenth day of disease, from being restless suddenly began to sink, and at 4 P.M. died.

Post-mortem state of cerebral membranes not noted; lungs congested; colon "not the seat of morbid change."

A case of climatic ardent continued fever. The treatment should be compared with that related in connection with the typical case given.

22. *Apperley*, aged 20; admitted 27th January 1873. Diarrhœa, the following day becoming dysentery. Treated with ipecac. in large doses, then perchloride of iron. In four days the dysentery had ceased. Tongue foul; great weakness; no gurgling; no abdominal pain; skin temperature morning 104·4, evening 103·8. On 5th, that is, tenth day of illness, lenticular spots, 30 in number, but position not stated; slight iliac gurgling; skin temperature morning 104·2, evening 104·8. On 10th bowels not loose; slightly delirious; abdominal tenderness; no maculæ; skin temperature not noted. On 12th symptoms less severe; pain in abdomen; spots well marked; temperature morning 100·4, evening 99·4; slight epistaxis. On 13th skin temperature morning 97·8, evening 99·8. From this date improved, and on 1st March discharged to attend.

The case was most probably one of dysentery.

23. *Browne*, aged 25; admitted 11th January. Abdominal pain; gurgling; tympanitis; furred tongue; brown sordes; symptoms of dysentery. On 21st the imperfect record available states that he was attacked with enteric. No further particulars given, except that he died on the 27th.

On *post-mortem* examination the pia mater congested; lungs much congested; lymph and fæcal matter in the peritoneal cavity; in ileum, two feet from ileo-cæcal valve, extensive ulceration and perforation; the state of large intestine unrecorded.

These meagre particulars point to enteric fever, but non-specific.

24. *Long*, aged 20; admitted 27th December 1872. Rigors; looseness of bowels; headache. Had ipecac. in large doses, grey powder, turpentine to abdomen. On 2nd January bowels loose; skin temperature morning 98, evening 97. On 3rd skin hot; not much abdominal tenderness; bowels moved twice a day; spots well marked; skin temperature evening 97. Report adverts more to negative than positive symptoms. Discharged on 12th February to go to Wellington.

Nature of illness indefinite; nothing to show that it was specific.

25. *Ruse*, aged 20; admitted 3rd February 1873. Severe febrile symptoms; abdominal tenderness; skin temperature 103; slightly delirious; had been ill three days; headache. Treatment not recorded. On 9th better; slight abdominal pain; skin cooler; no spots; dejecta scarcely characteristic; tongue brown, slightly dry. Continue ipecac. and Dover's powder; fomentations. From this date improved. On 19th, *i.e*, sixteenth day of illness, was discharged convalescent.

A case of *febricula*.

26. *O'Sullivan*, aged 21; admitted 12th February 1873. Ill four days with diarrhœa and pain in abdomen; giddiness; constipated; tongue furred; skin temperature evening 100·4. Had ipecac. 30 grains. On 14th abdominal tenderness; no spots; skin temperature morning 99·8, evening 100·2. Six leeches to abdomen; poultice; 15 grains of chloral at bed-time. The details in the record of the case are indefinite. He recovered and was discharged on 12th March.

His attack seems to have been really one of constipation. He was subsequently treated for dysentery.

27. *Taylor, J.*, aged 22; admitted 14th February 1873. Ill two days. Headache; giddiness; abdominal pain; pulse 120; skin temperature 100·2. On 14th with these slight purging; skin temperature morning 102, evening 100·8. On 18th slight headache; no spots; no abdominal tenderness; no diarrhœa; skin temperature morning 100·8, evening 103. Positive symptoms undescribed. From this date improved. On 1st March discharged to attend hospital.

Not enteric fever, otherwise nature of the attack uncertain.

28. *Weston*, aged 22; admitted 15th February 1873. Ill two days; malaise; headache; dilatation of pupils; pulse 140; skin temperature 105·4; slight diarrhœa; no pain. To take 30 grains ipecac. On 17th pyrexia moderate; skin slightly moist; *lenticular spots*, position not stated. To have a full dose of ipecac. Skin temperature morning 104·6, evening 105·2. On 18th no purging; tongue furred, moist; pupils dilated, eyes injected. On 20th much diarrhœa in evening. On 22nd improved; no spots, diarrhœa or pain; skin temperature morning 101·6, evening 104. On 27th tongue coated, dry at tip; drowsy; much thirst; skin covered with roseolous rash; no pain; skin temperature morning 102, evening 106. No remedies prescribed. 2nd March tongue dry; drowsy; pupils contracted; temperature morning 106, evening 106·4; difficulty in deglutition. On 3rd, at 5 P.M., condition alarming; breathing laborious; pupils fixed. At 7 A.M. insensibility; great congestion; temperature of skin unrecorded.

Post-mortem examination revealed cerebral membranes greatly congested; lungs enormously congested; ulceration of Peyer's patches at ileo-cæcal valve.

A case of ardent fever ending in heat apoplexy.

29. *Duddy*, aged 21; admitted 23rd February 1873. Ill three days; headache; nausea; diarrhœa; skin temperature morning 102·4, evening 103. Ipecac. grains 30. On 27th tongue

cleaning; *spots* on abdomen visible; pain in back; none in abdomen; pupils slightly dilated; skin temperature morning 103, evening 103. On 5th March better; tongue cleaning. From this date improvement progressed, and on 22nd he was discharged convalescent.

Appears to have been a case of febricula with a temporary exacerbation.

30. *Spillan*, aged 22 years; admitted 26th February 1873. Had been indisposed some six or seven days; felt heavy; skin temperature morning 101·6, evening 104·4. Had ipecac. 30 grains; tongue creamy, red at tip. On 28th less pain in head; no spots or tenderness in abdomen; nocturnal exacerbations severe; roseolous rash noted; skin temperature morning 101·4, evening 103·6. On 1st March red tint of abdomen superseded by lenticular spots. On March 3rd convalescing; slightly giddy; tongue nearly clean; bowels previously confined have acted. From this time he improved, and on 15th March was discharged to attend.

Appears to have been a case of simple continued fever.

31. *Armstrong*, aged 20; admitted 27th February 1873. Ill two days; headache; furred tongue; skin temperature morning 103°, evening 104°. A full dose of ipecac. Slight abdominal pain. On March 1st pupils dilated; epistaxis; skin pungent; rose rash on abdomen; skin temperature morning 102°, evening 103·8; diaphoretics. On 2nd epistaxis; spots well marked; headache diminished. On 3rd epistaxis; pain in abdomen; bowels torpid; skin temperature morning 100, evening 102. On 10th abdomen dusky, not maculated. On 12th had giddiness; weakness; bowels constipated; skin temperature morning 101, evening 103·2. On 13th skin moist; better; skin temperature morning 101·6, evening 103. On 14th again better, but skin temperature morning 103, evening 105. On 18th free epistaxis; skin temperature morning 101, evening 103·4. 19th, skin temperature morning 101·8, evening 105. On 20th "*in excellent health*;" skin temperature morning 103, evening 104·4. Had tepid sponging, 5 grains of pulv. Jacobii. On 22nd no pain; is low; epistaxis; no abdominal symptoms. On 26th no symptoms except great weakness and sense of heat; skin temperature morning 102·5, evening 105. Sponged with cold water and relieved. 29th gradually mends; no symptom except skin temperature morning 99·6, evening 103. On 4th April, *i.e.*, thirty-eighth day of illness, skin temperature morning 99, evening 99·2. On 8th discharged, it does not appear what to.

The temperature chart shows this to have been a case of *remittent fever.*

32. *Chapman*, aged 21; admitted 4th March 1873. Skin hot; lumbar pains; headache; tongue coated; bowels costive. Castor-oil, then ipecac. On 5th febrile symptoms increased; headache severe; no abdominal pain; skin temperature morning 102·6, evening 103·8. On 8th after full dose of ipecac., bowels loose; tongue brown and dry; an enema of ipecac. 12th much better; temperature morning 99·6, evening 102·2. On 16th better. Continued to improve, and on 26th discharged to attend.

Appears to have been *continued fever with cerebral congestion.*

33. *Grey*, aged 20; admitted 23rd March 1873. Ill one day; headache; giddiness; bowels torpid; evening temperature 104·4; skin cool. On evening of 25th a rather severe exacerbation. On 26th relieved. On 28th no symptom except slight headache; skin temperature morning 99·6, evening 102·8. To have diluted hydrochloric acid. From this date improved, and on April 3rd, *i.e.*, seventeenth day of illness, *discharged* convalescent.

A case of febricula.

34. *Rourke*, aged 21; admitted 3rd April 1873. Diarrhœa first mentioned after he had saline mixture. The character of spots seen on abdomen is noted as doubtful. On ninth day of attack bowels natural. He then had muttering delirium. He suddenly fell on tenth day of disease into coma with clammy perspiration; laborious breathing; contracted pupils; violent action of carotids; skin very pungent; temperature at 7-40 P.M. of skin 108. Died at 8 A.M. of 10th.

On *post-mortem* examination there was suffusion and increased vascularity of head and lungs; the large intestine, like the small, presented discolored patches, and some ulceration of solitary glands.

From temperature chart and state of brain and lungs this was a case of climatorial remittent fever ending in heat apoplexy.

35. *Hardinge*, aged 26; admitted 7th April 1873. Ill four days; shivering; frontal headache; much pyrexia; skin temperature not noted. Had calomel and saline mixture. Bowels torpid. On 10th no abdominal pain; skin slightly pungent; temperature morning 102·5, evening 105. Continue diaphoretic, fomentations to abdomen. On 12th improving; skin temperature morning 101·6, evening 105·2. On 18th much better; very deaf; pupils much dilated; skin temperature morning 99·6, evening 100·6. On 27th pupils still dilated; otherwise much better. On 27th discharged convalescent.

A case of continued fever with determination to the head; climatorial, non-specific.

36. *Parron*, aged 25; admitted 7th April 1873. Ill three days; malaise; foul tongue; pain in limbs; skin temperature 102·7, evening 102·4. Calomel grains 5 and saline draught. On 9th skin pungent; temperature morning 104, evening 104·8. Wet sheet applied and caused much diaphoresis. On 12th headache gone; pupils normal; muscular twitchings subsided. Continue hydrochloric acid. On 14th much better; pupils slightly dilated; skin temperature 101·8, evening 103; bowels constipated. From this date improved slowly. On 3rd May discharged convalescent.

A case of ardent remittent fever.

37. *Wade*, aged 20; admitted 10th April 1873. Ill three days; malaise; heat, headache; skin temperature morning 102·4, evening 104·6; bowels torpid. Cold to head, castor-oil enema. On 16th headache; tumid abdomen; slight pungency of skin; temperature morning 105·4, in evening an exacerbation. Morphia grain ⅛ with acid. sulph. at bed-time. On 18th considerable pungency of skin; no abdominal pain or gurgling; bowels normal; a blister had been applied (to nape ?); pupils dilated, eyes suffused; skin temperature morning 102·4, evening 102. On 20th evening exacerbation well marked; skin temperature morning 99·8, evening 104. On 21st had practically no symptoms. On 29th had done well, but had suffered two slight relapses. Discharged to attend hospital.

A case of climatorial remittent fever.

38. *Ryland*, aged 23; admitted 18th April 1873. Ill eight days with dysenteric symptoms; attacked with pyrexia; right pupil slightly dilated; iliac tenderness; skin temperature morning 101·6, evening 102·4. Had abdominal fomentations and lead and opium enemata. On 18th in evening had double lobular pneumonia. Tinct. camph. co. and sulph. acid, cataplasm to chest. On 20th skin temperature morning 101·8, evening 103·6; pneumonic symptoms slightly relieved; great diaphoresis. On 23rd better; skin temperature morning 100, evening 100. On 27th returning respiration at bases of both lungs; bowels very loose; skin temperature morning 98·2. On May 1st pain in hepatic region; skin temperature morning 96·6, evening 99·4. A blister over seat of liver. On 3rd no pain or cough; debility; pain in *lower lobe* of right lung. From this date improved slowly. On 13th was discharged convalescent.

Appears to have been a case of malarial fever complicated with dysentery and pneumonia.

39. *Smythe*, aged 34; admitted 9th March 1873. Some headache; heat of body; malaise; thirst; foul tongue. Had a purgative and diaphoretic. Ill five days. On 10th tongue much coated and dry; headache; no other pain; a full dose of ipecac. Skin temperature morning 102·8, evening 104. On 11th bowels normal; no abdominal tenderness. Another dose of ipecac. Skin temperature morning 102, evening 102. On 14th head felt very heavy; otherwise not worse; skin temperature morning 101, evening 102·8. Treatment unrecorded. On 17th weak; despondent; tongue coated and dry; pulse weak, 80 to 88; skin temperature morning 100, evening 101·2. On 22nd weak; otherwise convalescent. Chiretta and nitro-muriatic acid. On 30th March, *i.e.*, twenty-sixth day of illness, discharged convalescent.

Appears to have been a case of simple continued fever.

40. *Ransom*, aged 22; admitted 20th April 1873. One day ill; pungent skin; temperature 103·2; foul tongue; slight abdominal pain. Dilute hydrochloric acid, turpentine to abdomen. On 21st eyes suffused; face flushed; bowels freely moved by means of salines; abdomen normal; skin temperature morning 102, evening 104·4. On 24th epistaxis for some days; slight headache; more pain in abdomen; skin temperature morning 102, evening 102. Fomentations to abdomen. On 27th, *i.e.*, eighth day of illness, no symptoms; skin temperature morning 99·2, evening 98·5. On 30th, *i.e.*, tenth day, skin temperature 99·4. Discharged convalescent.

Appears to have been simple continued fever. On 4th May was readmitted under that heading and again discharged on 10th.

41. *Trinder*, aged 23; admitted 18th May 1873. Had shortly before suffered from diarrhœa. On date of admission epistaxis; giddiness; involuntary muscular spasms. Turpentine fomentation to abdomen, calomel and pulv. rhei, two leeches behind each ear. Skin temperature 104·6. On 21st pupils normal; skin moist, temperature morning 103, evening 105·6; slight diarrhœa; had sulphuric acid and opium. On 22nd sleepless; skin pungent; temperature morning 104, evening 105; tongue dryish. Treatment unrecorded. On 25th worse; tongue brown, tremulous; slight abdominal pain; bowels moved twice in 24 hours; skin temperature morning 103, evening 105. On 27th mind obscured; tongue tremulous; bowels relaxed; skin temperature evening 104·6. Acetate of lead and opium as enema, abdominal fomentations. On 30th taking ½ drachm doses of tinct. cinchona, with 1 ounce brandy and 1 egg every three hours; tongue tremulous, dry, cannot be protruded; sensorium disturbed; skin temperature morning 104·6, evening 105·6. On June 2nd, *i.e.*, eighteenth day of illness, better; sleepy; tremorless; bowels steady; skin temperature morning 102·8, evening 102·8. Treatment unrecorded. On 4th on previous night lively delirium; sleepless; tongue dry; sordes on teeth; bowels moved three times; skin temperature 102. Morphia ¼ grain, sulph. æther. On 8th, *i.e.*, twenty-fourth day, skin temperature morning 98·2, evening 100. Convalescent. Is taking quinine and acid. On 21st, *i.e.*, thirty-seventh day, headache sometimes recurred; bowels loose; slight abdominal tenderness; skin temperature morning 102·2, evening 102. Small blister applied over right iliac region; to have quinine 1 grain with diluted muriatic acid every three hours. From this date daily improved. On July 1st, skin temperature 97·6. On 27th, *i.e.*, twenty-second, was discharged to light duty.

A case of continued fever running into typhoid condition as described in older books; climatorial and non-specific.

42. *Wright*, aged 22; admitted 19th September 1873. Ill five days; at first rigors; malaise; sleepiness. On admission headache; tongue very foul; skin temperature 102·4; abdominal pain; diarrhœa. Treatment unrecorded. On 20th pain in right ileum; stupor; pungency of skin; temperature morning 104, evening 105·4; abdomen tympanitic; tongue dry, cracked; sordes on teeth and gums. On 22nd lies in stupor; skin temperature 104·4; pulse 100; bowels loose; delirious; no *spots*; abdomen tympanitic. On 24th, *i.e.*, tenth day, worse; sordes; no

spots; skin burning. 3 P.M. slight rigor; became cold after a little; hot bottles being applied; rallied at 6 P.M.; recurrence of rigor; rallied a little; then sank and died at 1-30 A.M., 25th, on eleventh day.

Post-mortem examination details regarding state of cerebral membranes not given. Lungs congested; colon healthy; Peyer's patches tumefied; two small ulcers at ileo-cæcal valve. The case appears typical of true malarial remittent or jungle fever.

43. *Moulton,* aged 26; admitted 14th September 1873. Ill four days with pyrexia; malaise; slight diarrhœa. Dover's powder failing to check it, he had a pill of ipecac. and opium, extract of gentian and blue pill. On 17th skin temperature morning 103·8, evening 103; abdominal pain. Small doses of ipecac and Dover's powder, fomentations. On 20th, *i.e.,* the eighth day, much headache; deaf; pungent skin; temperature morning 101·2, evening 101·2; abdomen lank; diarrhœa, dejections watery, yellow. Four leeches to the head. On 22nd blister to scalp; active delirium; skin temperature morning 101·4, evening 100·8. Ipecac. and quinine. On 25th improved; mind clear but perception slow; skin temperature morning 101·2, evening 101·6. Continue quinine. On 27th cheerful; no pain. On October 1st, *i.e.,* nineteenth day, powers flagged greatly; skin temperature 101·2; pulse 80, small; cold perspiration; mind obscure; quinine 4 grains, sp. æther sulph. ½ drachm every three hours, egg flip every two hours. On 2nd had rallied; deaf and unintelligent. Omit quinine. Skin temperature morning 105, evening 101·6. No medicines. On 6th October condition not altogether satisfactory, *i.e.,* twenty-fourth day of disease, symptoms negative, but he makes little progress; skin temperature 100·2; pulse 84. On 20th October, *i.e.,* thirty-eighth day of illness, the record of his case alludes only to a cutaneous eruption, for which he was subsequently treated till discharged convalescent on 1st December.

So far as can be made out from the record of the case and the chart of temperature, this would appear to have been one of irregular remittent fever non-specific, but in an unhealthy subject.

44. *Rodgers,* aged 22; admitted 6th October 1874, after an interval of nearly a year since the previous case of so-called enteric fever. Case entered in case-book as one of continued fever; tongue clean; slight pyrexia. Ill five days; temperature on admission 103·4; pulse 132; bowels constipated. On 10th face flushed; tongue clean; bowels moved two or three times. On 13th epistaxis to slight extent; drowsy; pulse full and soft; restless at night; many lenticular spots on thighs. On 15th a little better; tongue moist and less dirty. On 26th had continued to improve; had boils on the head. Taking acid nitric dil. On December 5th, *i.e.,* on fifty-seventh day of illness, discharged as convalescent.

A case of continued fever, non-specific.

45. *Osborne,* aged 21; admitted 6th January 1875 under the head of simple continued fever. Pyrexia; tongue furred; with slight headache. Diaphoretic mixture. On 9th in afternoon an exacerbation of fever; pulse 82; skin temperature 100·6; abdominal pain; not moved for two days. Had castor-oil. On 12th, *i.e.,* the fifth day, abdominal pain; gurgling; a considerable number of rose-colored "*petechiæ*" on abdomen; pulse 82; skin temperature 101·6. Taking diaphoretic mixture. On evening of 13th, *i.e.,* seventh day, temperature 103; pulse 92. On 14th temperature morning 101, evening 103·8. To take wine and egg mixture. On 20th skin temperature morning 103·4, evening 105·2. On 21st better; looks brighter; bowels relaxed, but dejections natural. From this date continued to improve, and on 14th February was discharged well.

The precise nature of the case, according to the record, is left doubtful; according to temperature chart it probably was *enteric* non-specific.

46. *Death,* aged 25; admitted 15th April 1875 under the head of simple continued fever. Malaise; nausea; giddiness; frontal headache. Ill four days; bowels torpid; skin temperature noon 103·2, evening 102. Calomel and saline acted freely. On 17th headache; lumbar pain; three leeches to each temple with relief. On 21st recorded as a case of enteric fever; tenderness in iliac fossa. Two evacuations in 24 hours, not characteristic; much pain in head; skin temperature morning 98·8, evening 99·8; blister to vertex, eggs, *bark* draught. On 22nd or eleventh day improved. From this date convalescence advanced, and on 24th May, *i.e.,* forty-third day of illness, was discharged to duty.

Nature of attack doubtful. The record indicates *adynamic* climatorial fever.

47. *Green,* aged 26; admitted 26th April 1875. On 27th skin temperature morning 102·4, evening 101·8, hot; tongue coated; bowels free. No treatment recorded. On 28th mist. diaphoretic; dry cough. On 30th body covered with sudamina; abdominal tenderness; skin temperature morning 102·9, evening 102·7; cough. Sulphuric acid drink, fomentations to chest. On 3rd May pain in left mammary region; delirious last night; bowels moved three times. On 5th, *i.e.,* fifteenth day of illness, better; had sleep. On 22nd a slight attack of dysenteric diarrhœa; had had dysentery shortly before. Pulv. ipecac. grain $\frac{1}{10}$, morph. mur. grain $\frac{1}{12}$ thrice daily, fomentations to abdomen. From this date improved, and on 2nd June, or forty-first day, discharged, how is not stated.

Nature of illness not definite, except not *enteric*; appears to be febricula.

48. *Rooney,* aged 22; admitted 28th April 1875 under the head of simple continued fever. Headache; lumbar pain; bounding pulse. Cold to head, body sponged, acid drinks. Skin temperature morning 106, evening 102·8; pulse 96 and 92. On 4th May, *i.e.,* eighth day, tongue

cleaner ; sleepless ; skin temperature morning 101·8, evening 100·4. On 7th, *i.e.*, eleventh day, improved; skin temperature morning 99·9, evening 102·8. Continue treatment by acetate of ammonia. On 11th, *i.e.*, fifteenth day, sharp pain in back of head. Potass bromid. grains 5, quinæ sulph. grain 1, acid sulph. dil. m. 2 thrice a day. Bowels regular; tongue furred. On 13th convalescent ; skin temperature normal. On May 30th, *i.e.*, thirty-fourth day, discharged convalescent.

Febricula, not enteric fever.

Remarks.—Following the order adopted in regard to the cases extracted at other stations, I note the following results with reference to those at Cannanore, viz., that 1 was a case of climatorial non-specific fever with hepatitis and dysentery; 2, ardent fever ; 3, climatorial fever, non-specific, with enteritis ; 4, ardent fever; 5, malarial fever ; 6, febricula ; 7, ardent fever, running into heat apoplexy: 8, endemic fever, adynamic, non-specific; 9, continued fever, becoming adynamic, non-specific; 10, diarrhœa and febricula; 11, typical *enteric*, climatorial and non-specific ; 12, endemic remittent becoming continued ; 13, atonic diarrhœa ; 14, diarrhœa ; 15, uncertain, except that it was not specific enteric; 16, uncertain, except that it was not specific enteric; 17, diarrhœa; 18, simple continued fever, non-specific ; 19, malarial fever ; 20, continued fever, non-specific, with abdominal " determination " ; 21, ardent fever ; 22, dysentery ; 23, *enteric* fever, non-specific ; 24, uncertain, except that there is nothing to show the case was specific enteric fever ; 25, febricula ; 26, constipation followed by dysentery ; 27, uncertain, except that nothing specific is indicated ; 28, ardent fever ending in heat apoplexy; 29, febricula; 30, simple continued fever, non-specific ; 31, remittent fever ; 32, continued fever with cerebral congestion ; 33, febricula ; 34, remittent fever ending in heat apoplexy; 35, continued fever with cerebral determination, non-specific ; 36, ardent remittent fever ; 37, climatorial remittent ; 38, endemic fever, complicated with pneumonia and dysentery; 39, simple continued fever; 40, simple continued fever; 41, continued fever becoming adynamic, non-specific; 42, endemic remittent fever; 43, irregular remittent fever in an unhealthy subject, non-specific ; 44, continued fever, non-specific; 45, *enteric* or typhoid, non-specific; 46, adynamic continued fever, non-specific; 47, febricula ; 48, febricula. Thus it appears that a very great variety of cases were originally grouped and described as being of typhoid fever, their actual nature climatorial, their cause endemic and non-specific ; also that only three cases occurred that bear comparison with typical enteric fever, namely, 11, 23, and 45, but in the history of none of them have specific causes been traced. In a considerable number of cases the report is so imperfect, the details so unprecise, that nothing can be gathered except that indications of specific fever are wanting; this particularly refers to 15, 16, 24 and 27, but the remark is more or less applicable in other instances. With regard to the occurrence of so many cases within a brief period at Cannanore, the circumstance to my mind illustrates what has already been said with regard to endemic fever at times and under particular conditions prevailing as an epidemic among troops newly arrived in a tropical from a temperate climate. The fact moreover is noteworthy, that the Medical Officers with the 43rd Regiment at Cannanore were without previous experience in connection with diseases of India. During my incumbency I hope to prevent a recurrence of so unfortunate a condition with reference to newly arrived regiments from the United Kingdom.

CASES AT ST. THOMAS' MOUNT.

Average annual strength of British troops at this station—

Officers	9
Men	342
Women	63
Children	115

28. The following are the only records now available of cases of so-called typhoid fever at this station, namely :—

1. *Lorley*, R.A., aged 22; admitted 7th April 1877. Febrile symptoms; hot skin; furred, tremulous tongue. Had been drinking for some time. Saline purgative, diaphoretic mixture. Beef-tea, milk, soda water. On 10th (no record during the interim), skin temperature at 6 P.M. 105·2. Tinct. of aconit. m. 1 every ¼ hour up to 8 minims, blister to temples, a bath at 89°,

hydrate of chloral grains 25 at bedtime. On 11th delirious; pulse 110; no diarrhœa. Morphia ¼ grain hypodermically. At 3 P.M. extremities cold; pulse hardly perceptible; skin temperature 101·4. Sinapisms to neck, blister over occiput, hydrate of chloral 30 grains, a turpentine enema. On 12th, at 8-5 A.M., had an attack of convulsions and died at 8-10.

Post-mortem examination revealed vessels of pia-mater congested; effusion into lateral ventricles; choroid plexus, highly congested; small intestines studded with ulcers, but their position and other particulars regarding them unstated.

A case of ardent fever, the combined result of climate and drink. The treatment contrasts unfavorably with that noted in illustrative cases from the works of the older and more experienced medical officers.

2. *Burroughs*, R.A., aged 46; admitted 22nd August 1877. Simple continued fever. No record of the case till 21st September; was then very weak; had occasional slight fever. Quinine. Had for a week had ale daily; on that day 5 ounces of brandy given instead. Milk diet; eggs. On 25th had been delirious the previous night; somnolent; deaf; skin temperature morning 103 F., evening 102·4. Diaphoretic mixture. On 26th half conscious; skin temperature morning 102, evening 103·4. Quinine 5 grains hypodermically, carbonate of ammonia and nitric ether. On 28th much less dull; a slight bed-sore; some abdominal tenderness; skin temperature morning 102, evening 103. On 29th had passed a fair night; skin temperature morning 101·4, evening 101·4; pulse 100, small; respiration easy; perspiration free. Quinine and opium three times a day; ice, chicken broth; brandy 6 ounces. On October 1st somewhat better. From this date improved slowly, and on December was discharged to be sent to England as an invalid.

The case appears to have been one of endemic fever, adynamic in type. It is recorded in the case book as one of continued fever, and yet noted in the return from which the appendix is compiled as one of typhoid, no explanation being given in regard to the discrepancy. The treating medical officer was young and inexperienced.

Remarks.—The result of these two abstracts shows clearly that in one case the disease was ardent fever passing into heat apoplexy, the other of continued fever, neither of them in reality typhoid fever.

CASES AT PALAVERAM.

29. This station is only occupied by British troops for a few months annually during the monthly practice of the regiments quartered in Fort St. George. The average yearly strength of this detachment was—

Officer	1
Men	31
Women	2
Children	4

1. *Sandford*, 1-21st Regiment, aged 29; admitted 23rd November 1873 with symptoms of continued fever, having been indisposed three or four days previous. On 24th skin acting well. On 25th high fever. Had vin. antimon., tart. and acetate of ammonia mixture, followed by quinine in 3-grain doses. On 26th slightly deaf; has slight pain in abdomen. On 29th much weaker; tongue dry and brown; is very deaf. At 5 P.M. slight pain on pressure in abdomen; no rash. Chlorodyne m. 20 immediately, fomentations to abdomen. On 30th marked change to the worse; tongue harsh, dry, brown; skin moist; fever not very high; diarrhœa. Continue quinine, chlorodyne, and hot fomentations. Port-wine 4 ounces. At 5 P.M. the abdomen tympanitic, painful on pressure; bowels lax; rose-colored spots on abdomen and chest; sudamina; temperature 99° F.; pulse 120; respirations 40. A turpentine enema given; the patient isolated. On 2nd tympanitis; abdominal pain and diarrhœa less; other symptoms more grave (these are not detailed). Had quinine grains 3 three times daily, starch and opium enema and fomentations continued, brandy substituted for wine. On 4th all symptoms except the diarrhœa aggravated; low muttering delirium; subsultus; abdomen painful and swollen; temperature 98·8. As is stated in the case-book, "a very irregular thing in a case of this description" (meaning enteric fever). He gradually sank, and died at 6-15 A.M. on 6th.

In the *post-mortem* examination the mucous membrane over the agminated glands congested, especially near the ileo-cæcal valve; the mucous membrane of the large intestine similarly congested; no ulceration.

From the above record, and absence of any mention of exposure of the patient to the producing causes of enteric fever, it seems to me that the case was one of *non-specific* continued fever.

CASES AT MALLIAPOORAM.

30. Average annual strength of British troops at this station—

Officers	4
Men	95
Women	5
Children	7

1. *Gadsby*, 48th Regiment, aged 23; admitted 8th June 1877. Had felt unwell three days. Feverish, with diarrhœa; pulse 95; skin temperature 101·8; face flushed. Dover's powder 5 grains twice a day; tinc. opium m. 20 at night; beef-tea; barley-water. On 11th pain over transverse colon; gurgling in right iliac fossa; two *suspicious* spots on abdomen (twelfth day of attack); skin temperature 101·4; pulse full, about 90; tongue red, dry. In evening skin temperature 101·4; pulse slow; diarrhœa, evacuations yellowish brown. Continue Dover's powder, a sedative draught. On 13th a few more pink spots which disappear on pressure; the first are faded; skin temperature morning 98, evening 101·2. No pronounced symptom recorded. On the 17th night the nineteenth day of attack, better; no pain or gurgling. From this date he improved steadily, and on 11th July was discharged to attend.

A case of mild febricula, non-specific.

31. The information received in regard to enteric fever at the undermentioned stations is purely negative, the documents submitted being returned to me blank.

—	Average Annual Strength.			
	Officers.	Men.	Women.	Children.
Fort Saint George	29	599	94	193
Poonamallee	4	167	32	67
Calicut	2	97	2	4
Ramandroog	1	50	6	14
Trichinopoly	9	277	27	55
Seetabuldee	2	49	2	2

BRITISH BURMAH.

32. The general remark must be made that with the exception of the individual cases given below, particulars regarding those said to be of enteric fever among the troops stationed in Burmah are so meagre and indefinite that for the purpose of this report they are valueless. Either no record has been kept in the case-book, or the record is not now available; all that seems to have been considered necessary was that some of the medical officers should designate certain cases enteric fever. Casualty reports of fatal cases were of course sent by them to the Office of the Surgeon-General, but such reports fall short in regard to many important details. The attention of the medical officers concerned has been drawn to the unsatisfactory nature of reports on this subject hitherto received from them.

CASES AT RANGOON.

33. Average annual strength of British troops at this station—

Officers	29
Men	755
Women	81
Children	160

For the purposes of this report, however, it becomes necessary to eliminate other portions of the force, except that of the Infantry, from which alone information, such as it is, has been obtained. The strength of that arm accordingly was—

Officers	16
Men	631
Women	62
Children	123

Cases in 67th Regiment.

1. *Simms*, aged 29; admitted 3rd March 1873. Heat of skin; headache; languid pulse; roseolar rash over abdomen and thighs. On 6th much heat of skin. Diaphoretic mixture. On 10th some pain in right shoulder; an abscess forming on left arm (position and character unrecorded). On 13th abscess opened. Perchloride of iron with quinine given. Pain in right side (no further particulars); a blister applied on 15th; suppuration over *right* biceps near the shoulder, opened. Left leg œdematous near the ankle. On 24th an abscess having formed on upper and inner part of left thigh, opened. On April 1st disease *changed* to *abscessus* or pyæmia of English authors. On 28th sent to Madras as a convalescent. No further particulars in regard to this case, treatment, or diet.

It is recorded in the case-book itself as one of abscess, and yet headed "enteric fever." It clearly was not the latter disease.

2 *English*, aged 19; admitted 10th March 1873. Pyrexia; had chills, but no actual rigor; much constipated; abdominal pain. Had a purging draught. On 12th feverish. Quinine grains 5, pil. hydrarg. grains 10, Dover's powder grains 10 at night. On 20th much depression. Infusion of cinchona, chlorate of potash, beef-tea, brandy 1 ounce, wine 1 ounce. On 25th convalescent. On April 10th discharged.

The nature of the case uncertain, except that it was not one of enteric fever; probably constipation and febricula.

3. *Powell*, aged 21; admitted 10th March. Headache; giddiness; weakness; heat of skin; throbbing pulse. Diaphoretic mixture, cold to head. On 12th tenderness over cæcum; diarrhœa. On 13th March abdominal tenderness. Bicarb. potass grains 30 and citric acid in effervescence, foment abdomen. On 15th March depression; frequent diarrhœa. Enema of acetate of lead. Milk diet. Brandy 2 ounces, wine 1 ounce. On 28th improving. On 10th April discharged.

From a meagre and indefinite report the nature of the case is uncertain, except that it was not specific enteric. In some respects it is like febricula with diarrhœa.

4. *Taylor*, aged 21; admitted 8th May, discharged 27th May. Not a single further particular given with regard to the case.

5. *Barber*, aged 20; admitted 1st July, died on the same day. His case not to be found in the case-books. From the casualty report it appears that the brain and membranes were *healthy*; lungs congested; in ileum six ulcers of various sizes in the muscular coat and along the direction of the intestine, edges defined and smooth.

From the meagre account contained in the tabular abstract in the appendix the case seems to have been one of heat apoplexy. The *post-mortem* appearances recorded do not alter my conclusion. They, however, are interesting in relation to the case.

Cases in 21st Regiment.

6. *Collier*, aged 28; admitted 18th August 1877. Very slight fever, but of low character; no pain. Ill two days; skin nearly of natural temperature. On 21st skin temperature morning 102, evening 103. The remark made that the temperature is not that of typhoid, yet the case is suspicious. On 23rd very bilious stools; skin temperature 102; no spots; tongue creamy; debility the chief symptom. On 27th very weak; but better of fever; skin temperature morning and evening 101. The treatment unrecorded, except that he was now ordered 4 ounces of wine. On 28th temperature 99; convalescent. On September 1st he was ordered wine, and on the 8th was discharged.

There is nothing to justify the impression that this case was typhoid; otherwise the imperfect record leaves its nature doubtful. It is more like febricula than anything else.

Remarks.—The general result of the above analysis of cases, according to my interpretation of their indications, is as follows, namely:—1, was a case of abscess, or pyæmia as described by British writers; 2, constipation and febricula; 3, uncertain, except that indications of specific enteric fever were wanting; 4, no particulars regarding the history of the case available; 5, presents indications of heat apoplexy but none of specific enteric fever; 6, like febricula, non-specific. Thus of the 6 cases at Rangoon recorded as of enteric fever, it appears to me that not one really was of *that* disease.

CASES AT THYETMYO.

34. Average annual strength of the British troops at this station—

Officers ...	21
Men ...	641
Women ...	71
Children ...	177

No record with regard to enteric fever of such a nature as to admit of their being made use of here have been received, except from the 67th foot; the average strength of that regiment is noted as consisting of—

Officers	16
Men	508
Women	52
Children	103

The cases returned as of enteric fever are the following, the remark being premised that an epidemic of *dengue* at the time occurred among the troops.

1. *Steers,* aged 22; admitted 17th July 1874. Had been ill several days; abdominal pain; calls to stool frequent, scanty evacuations; pulse small and hard; thirst. Diaphoretic mixture three times a day; Dover's powder 10 grains at night, fomentations. On 25th bowels loose, motions scanty; the patient very weak Decoct. cinchonæ, 1 ounce, carb. ammoniæ three times a day. Continue fomentations. 30th bowels very loose; pain and tenderness over abdomen; slight gurgling on pressure (position unrecorded). On 31st *three* or *four* rose-colored spots on abdomen, disappearing on pressure. A blister over the cæcum. Decoct. cinchonæ and chlorate of potash. Beef-tea, lemonade, milk, cornflour. On 1st August bowels very free; tongue red and glazed; skin hot; deafness; noise in the ears. Acetate of lead in enema. On 6th slightly improved; skin cool; tenderness over cæcum. On 10th improving. On 16th bowels constipated; castor-oil 6 drachms. On 17th still constipated. Infus. sennæ 6 drachms. No further report till 1st September, when it is stated that he was convalescing slowly. Chicken diet. Port-wine 10 ounces, lemonade 4 pints. On 5th a slight return of fever. Omit port-wine, claret ordered instead.

From this date improved, and on 26th was discharged convalescent.

No indication of enteric fever; otherwise the nature of the case is uncertain from an imperfect record. It resembles dysentery, except in respect to recovery from the treatment reported.

2. *Pointer,* aged 22 years; admitted 26th July 1874. Headache; face flushed; debility; tongue red, dry; pulse feeble; skin heat considerable; pain on pressure over liver; no spots; diarrhœa. Effervescing mixture, fomentations to abdomen, chlorodyne, hot water to feet. On 29th face livid; extremities cold; had much vomiting and purging. Had opiate enemata, beef-tea, brandy 8 ounces. Died at 7 P.M.

Post-mortem examination revealed enlarged and congested Peyer's glands; congestion in their vicinity above ileo celic valve; ileum congested.

The case presents some characters of heat apoplexy, others of cholera; none of enteric fever.

3. *Clarke,* aged 22; admitted 23rd November 1874. Ill four days; headache, malaise; furred tongue; diarrhœa; no eruption. Diaphoretic mixture, Dover's powder 5 grains. On 24th heat of skin; a sunken look; tenderness over abdomen on pressure; spongio-piline. Nitro-muriatic acid lotion over abdomen. 25th heat of skin; bowels relaxed. An opium enema. Milk diet. On 27th tongue dry; sordes on teeth. Chlorate of potass and decoction of cinchona. 29th diarrhœa continues. Repeat opium enema. On 1st December heat of skin abated. On 6th free from fever; tongue clean. On 18th discharged convalescent.

A case of endemic continued fever, non-specific.

4. *Kane,* aged 33; admitted 26th November. Headache; pains in back and limbs, the latter severe; skin hot, covered with a measly rash, especially on thorax and upper part of abdomen; sleepless; constipated. A few days ill before admission. His disease recorded at the time *dengue.* Castor oil, diaphoretic mixture. Milk diet. On 28th pain in hepatic region; skin hot. Fomentations and diaphoretics. On 30th still pain in right side. Ordered cholride of ammonium. At 4 P.M. sudden great abdominal pain; vomiting; great distress; coldness; depression. From this time did not rally. At 4 A.M. on the 2nd he died.

Post-mortem revealed in ileum congestion; Peyer's patches somewhat enlarged, not ulcerated; spleen enlarged, gorged.

The nature of the case uncertain; suspected to be dengue. Characters of specific enteric fever are wanting.

5. *Fitzallan,* aged 41; admitted 2nd January 1875. Lassitude; weakness; nausea; skin hot; small pulse. Diaphoretic mixture. Beef-tea. On 5th other symptoms continuing, evacuations semifluid; much vomiting; swelling of abdomen. Bismuth grains 3 three times a day, used since 3rd, to be continued. On 7th sickness less abdomen tympanitic. A blister to epigastrium Carb. sodæ grains 5 with mint water. On 9th sinking and died at 4 P.M. After death congestion of lower and upper third of small intestine. Peyer's glands enlarged.

From a meagre and indefinite record of this case its precise nature cannot be ascertained. There is, however, nothing in the record to indicate specific enteric fever.

6. *Mrs. Fitzallan,* age unrecorded; admitted 6th January 1875. Pains in limbs; hot skin; weak pulse; ill several days. Sulphate of quinine grains 3, Dover's powder grains 5 three times a day. On 8th had been slightly delirious at night. Alvine movement has been produced by medicine. To have castor-oil. On 10th again delirious during previous night; skin moist; in other respects also better. On 13th skin moist and cool; bowels torpid; tongue brown in

centre, slightly moist. On 15th improving, although still delirious at night. Lavement of warm water. Beef-tea, arrowroot, chicken soup. Further details of a definite description do not appear. Convalescence seems to have advanced slowly. She continued under treatment till 7th April, when she was discharged convalescent.

As far as can be gathered from a meagre and indefinite record, the case was one of endemic continued fever, adynamic, non-specific.

7. *Bamfield*, aged 24 ; admitted 5th August 1875. Headache ; weakness ; tremors ; pains in extremities ; abdominal tenderness. Dover's powder 10 grains. On 6th skin temperature about normal ; stomach irritable ; abdominal pain. Sinapisms. On 9th skin had been cool, followed by an accession of pyrexia yesterday ; abdominal tenderness. Tincture of aconite to abdomen. On 13th had had a good sleep ; constipated. Castor-oil. No further information, except that on 5th October he was discharged.

Nature of this case uncertain ; it presents no characters of specific enteric fever.

8. *Lawrence*, age 24, born in India ; admitted 3rd February 1876. Pains in epigastrium and right iliac region ; six ochre-colored liquid evacuations ; nausea ; frontal headache ; tongue tremulous, coated with yellow fur ; pulse 120 ; skin temperature 104 (in evening). Diluted sulphuric acid and opium mixture ; body sponged. On 8th tenderness and gurgling in iliac region. On 9th looks brighter ; three evacuations in 24 hours. On 12th still improving ; skin temperature 100. On 14th had not been so well during the night ; slight muttering ; skin temperature 99·6 ; pulse 92. On 18th, that is, sixteenth day of his illness, a few characteristic spots on abdomen. On 20th convalescent. On 24th doing well. No further record of the case occurs. He was discharged apparently on this date, on twenty-second day of his illness.

The duration of the case points to ordinary endemic non-specific continued fever, although the record certainly points to *enteric* fever from non-specific causes.

Remarks.—The above eight cases seem to have been as follows, namely :—1, uncertain, except that it presented no character of specific enteric fever, in some respects it resembled dysentery ; 2, in some respects like heat apoplexy, in others like cholera, in none like enteric fever ; 3, endemic fever, non-specific ; 4, suspected to be dengue, its nature uncertain, character of specific enteric fever wanting ; 5, uncertain, except that there are no characters of enteric fever ; 6, endemic fever, adynamic, non-specific ; 7, uncertain, except that there are no characters of enteric ; 8, the only case in which the symptoms assimilated to those of enteric fever, and in it no specific cause assigned, but its duration points to fever of endemic non-specific origin.

TONGHOO.

35. The average annual strength of the British forces at this station was—

Officers	16
Men	448
Women	44
Children	86

No useful information in regard to the present subject of inquiry has been obtained from this station.

THE ANDAMAN ISLANDS.

36. A small detachment of white troops is employed as a guard over prisoners in Ross Island ; its average strength—

Officers	3
Men	34
Woman	1
Children	4

The following particulars have been obtained relative to the prevalence of fever believed to be enteric or typhoid among this body, stationed at Port Blair on that island, viz. :—

1. *Farelly*, 2-10th Foot, aged 32 ; admitted 5th September 1871 ; sixth day of illness. On 1st had slight fever ; quinine 6 grains three times a-day. On 3rd a recurrence of fever. On 4th severe fever during the night ; on 5th quinine 3 grains ; hydrochloric acid m. 20 with water thrice a-day. On 6th had slept badly ; headache ; bowels relaxed ; skin temperature 100·4 ; had perspired slightly. Quinine and acid ; beef-tea diet ; milk ; custard and lime-juice. On 8th had slept well ; headache less ; tongue furred ; bowels tardy. Sulphate of magnesia

added to his quinine. On night of 10th had slept well; headache had returned slightly; no iliac pain. On night of 13th slept badly; headache; quinine continued. On night of 19th a recurrence of similar conditions; thirst; tongue coated. On night of 21st again headache; again on night of 23rd. On night of 26th. On 28th suffered also from conjunctivitis. On night of 29th slept badly; thirst; slight tenderness in right iliac region. On 3rd October was going on well. From this date recovery steadily took place, and on 27th November on 88th day of his illness he was discharged.

A case of tertian ague, the intermissions becoming after a time irregular.

2. *Watson*, 1-21st Regiment, aged 24; admitted 3rd February 1875; on sixth day of illness. On 1st malaise; pain in back; anorexia; skin hot and dry. Had not exposed himself to the sun. Saline mixture every third hour. On 2nd sudamina on abdomen. He was delirious. Quinine and diluted muriatic acid. On 3rd surface of body bedewed with perspiration; diarrhœa; no abdominal pain; "eruption well marked, but not so bright in color" (more definite particulars wanting). Skin temperature 103°. Diaphoretic mixture every three hours. No change recorded till 6th. On that day several rose spots on abdomen, each spot distinct fading on pressure, but not with distinct margin (consequently not characteristic of specific typhoid); subsultus tendinum. Continue quinine also diaphoretic mixture; beef-tea; barley water; butter-milk. On 8th a crop of spots; in other respects symptoms unchanged. Diluted hydrochloric acid m. 15 three times a-day. Port wine 6 ounces; milk; butter; arrowroot. On 9th respiration oppressed. On 10th delirium constant; skin temperature 103; a fresh crop of spots; diarrhœa; evacuations watery. On 11th sordes on teeth; slight gurgling in iliac region; swallows with difficulty. On 12th very ill and weak; spots disappeared from abdomen; abdomen not tense; delirium constant. On evening of 13th restless, and with difficulty kept in bed; subsultus constant. Had ether and ammonia; 10 ounces of wine. His condition remained unimproved. On evening of 15th a fall of temperature to 101·4° occurred; he appeared to be sinking. At 5 A.M. of 16th, that is 19th day of disease, he died. *Post-mortem* examination revealed dura mater distended by effusion; deposit of lymph under the arachnoid over the tubes of the cerebellum; congestion of glands of small intestine, and commencing ulceration near the ileo-cæcal valve; spleen enlarged; friable; liver normal

A case of non-specific, adynamic endemic fever.

Remarks.—Of the two cases recorded, one was of tertian ague, the other of adynamic endemic fever.

RECAPITULATION OF RESULTS.

37. I have now given to the best of my ability a careful analysis of all the cases recorded in hospital books as of enteric or typhoid fever, and in each have noted the treatment followed. With regard to the means employed I propose to say no more in this place than has already been stated. I trust, however, that the manner in which my remarks have been arranged will enable medical officers who may have access to this report to compare for themselves the measures employed in individual cases, with those recommended by the older medical officers of lengthened Indian experience, in the several forms of endemic disease I have noted.

In summarising the analysis of cases at individual stations, the following are the results obtained, *viz.*:—

(*a.*) *Wellington.*—Twenty-six cases recorded as of enteric fever. Of this number 7 were of ordinary endemic continued fever, 5 of continued fever of adynamic type, non-specific, 3 of febricula, 5 of ardent fever, 1 of heat apoplexy, 2 of endemic remittent, 1 of uncertain type, except that it was not specific enteric, 1 of bronchitis and phthisis, and 1 of hepatitis; none of specific typhoid. Of these numbers 9 cases proved fatal, viz., 2 by endemic continued fever; 3 by the adynamic form of that disease; 1 remittent; 1 ardent fever running into heat apoplexy; 1 heat apoplexy, and 1 by fever of uncertain type, non-specific.

(*b.*) *Bangalore.*—Thirty-five cases of so-called typhoid or enteric fever recorded. Of these 8 were of continued fever; 7 of the number assuming in their progress an adynamic type such as we find described in books by the older authors; 5 of febricula; 2 of ardent fever; 2 of heat apoplexy; 7 of endemic remittent; 1 of irregular type, endemic and non-specific; 1 having the characters of typho-malarial of some authors; 6 so indefinitely described that its precise nature is left uncertain, but no specific cause of the illness recorded; 3 of *typhoid* as the affection is described in books, but non-specific in origin, and might, with equal propriety, be included as of adynamic continued fever. In not one instance do the records indicate specific pythogenic enteric fever at this station. The fatal cases are 12 in number. Of these one was by ardent fever; 4 heat apoplexy; 1 adynamic fever, non-specific, endemic; 1 typho-malarial; 2 endemic remittent; 3 inadequately described. None of those presenting the characters of typhoid proved fatal.

(*c.*) *Bellary.*—Four cases recorded; of these 2 are rendered uncertain by reason of imperfect record; perhaps one of the 2 was mild remittent; 1 was irregular intermittent, and 1 of ardent fever; none really enteric. The fatal case was of ardent fever.

(*d.*) *Secunderabad.*—Forty cases; these on being analysed present the following, viz., 3 ardent fever passing into heat apoplexy; 11 ardent fever; 8 continued, non-specific; 1 febricula; 2 remittent; 1 heat apoplexy; 1 phrenitis from exposure and drink; and 3 adynamic, non-specific; 10 uncertain, but without reason to be considered specific. Of pythogenic specific enteric fever, not a case. Of 14 fatal cases recorded as from enteric fever, 3 were from ardent fever passing into heat apoplexy; 4 ardent fever; 1 uncertain, but with some characters of ardent fever; 1 heat apoplexy; 1 uncertain, but non-specific; 1 phrenitis from exposure and drink; 1 continued, 1 climatorial continued, adynamic in type; and 1 from ardent fever becoming adynamic.

(*e.*) *Kamptee.*—Of 2 cases recorded, 1 was of heat apoplexy, the other of endemic non-specific continued fever. Both ended fatally.

(*f.*) *Cannanore.*—Forty-eight cases. Of the number 4 were of ardent fever; 11 malarial endemic fever; 7 febricula; 2 ardent fever running into heat apoplexy; 4 of endemic continued fever of adynamic type; 8 ordinary continued fever; 2 dysentery; 3 diarrhœa; 4 uncertain in type, except that it was not specific; and 3 typical enteric or typhoid in so far as the phenomena of the cases are recorded, but produced by climatorial and non-specific causes. 9 fatal cases; of these 2 by ardent fever; 1 ardent fever ending in heat apoplexy; 3 by malarial remittent; 2 by endemic continued, and 1 by *enteric* fever, non-specific and caused by endemic influences.

(*g.*) *St. Thomas' Mount.*—Two cases; 1 of ardent fever; 1 of fever, adynamic in type. The fatal case, that of ardent fever.

(*h.*) *Palaveram.*—One case of non-specific fever and *fatal.*

(*i.*) *Malliapooram.*—One case, namely of febricula.

(*k.*) *Rangoon.*—Six cases, viz., 1 of febricula; 1 of heat apoplexy; 1 abscess or pyæmia; 1 constipation; 1 uncertain, except that it was not enteric, and 1 particulars unrecorded; none specific typhoid. 1 *fatal case,* namely, that of heat apoplexy.

(*l.*) *Thyetmyo.*—Eight cases, viz., 1 apparently of heat apoplexy and cholera; 2 endemic, non-specific; 1 of these the adynamic form of fever; 4 uncertain, except that they presented no character of specific enteric; 1 of them being suspected dengue. 1 case presented indications of typhoid fever, but of non-specific character. 3 cases fatal, namely, 1 of heat apoplexy; 1 of supposed dengue, and 1 uncertain, except that it was not of specific enteric fever.

(*m.*) *Port Blair.*—Two cases, viz., 1 of tertian fever, the other of adynamic endemic fever; in other words of typhoid as described in books, but non-specific. The latter was fatal.

CONCLUSIONS ARRIVED AT.

38. Thus we find that at *Wellington* there occurred of so-called enteric fever 26 cases, of which 9 were fatal. Of these 5 cases of which 3 fatal were of the adynamic type of endemic fever; not one of specific typhoid or enteric.

At *Bangalore* of 35 cases so-called, 12 were fatal; of all that occurred, 3 only, and none of them fatal, presented characters of typical enteric, and in all of them the attack was non-specific; 7 others of the number, 1 fatal, were cases of adynamic non-specific endemic fever.

At *Bellary* 4 cases, 1 fatal, but none presenting the characters of adynamic endemic fever or of typhoid.

At *Secunderabad* 40 cases, 14 fatal; of these 3 cases and 1 death by adynamic endemic fever, none answering the description of specific typhoid.

At *Kamptee* 2 cases both fatal, neither presenting characters of adynamic fever or of typhoid.

At *Cannanore* 48 cases, 9 of them fatal; of the number, 4 with no death of adynamic endemic fever; 3 with 1 death by typhoid of non-specific character.

At *St. Thomas' Mount,* 2 cases, 1 fatal; that which recovered of adynamic endemic fever; no typhoid.

At *Palaveram* 1 case, and it fatal; its character neither adynamic nor typhoid.

At *Malliapooram* 1 case, and it recovered; neither adynamic nor typhoid.

At *Rangoon* 6 cases and 1 death, none either adynamic or typhoid.

At *Thyetmyo* 8 cases with 3 deaths, 1 having the characters of adynamic fever, the other of typhoid, both non-specific and neither fatal.

At *Port Blair* 2 cases, 1 fatal; that in which death occurred, of adynamic endemic fever.

Thus, out of a total number of cases of sorts grouped by regimental medical officers under the head of pythogenic typhoid fever and treated in relation thereto,

amounting to 175, we find that 54 proved fatal, giving a ratio of mortality to treated equal to 30 per cent. In 22 of these cases the character of the attack was that of adynamic, endemic fever; of them 6 were fatal, equal to a ratio of 27 per cent.; and of 7 cases presenting characters of typhoid fever as described in books, 1 proved fatal,—the data thus presented, too limited for conclusions, but as far as they go, giving a rate of mortality equal to 14 per cent. For purposes of comparison I note the circumstance that, according to Dr. Murchison, the rates of mortality by specific typhoid fever in the United Kingdom equal to 20 per cent. in persons from 15 to 30 years of age; 27 per cent. from 30 to 50, and 46 per cent. beyond that age. In 10 years the general rate of mortality by the disease was 18 per cent. In the London Fever Hospital during 10 years the general rate of mortality by continued fevers of all classes was equal to 16 per cent.; of patients brought in before reaching the advanced stages 14. The rate of mortality, however, varied according to years, having been 20 per cent. in 1848 and 7 per cent. in 1851.

TWO CHARACTERISTICS OF TYPHOID.

39. Much stress has been laid upon the occurrence in cases of specific typhoid fever, of an eruption characteristic of the affection; much also upon pathological changes, said to constitute the essence of the disease itself, to be constant in, and characteristic of it. In reference to both these subjects the following remarks present themselves as results of inquiries already recorded, viz.:—

(*A.*) *Cutaneous eruption.*—From the imperfect observations recorded on the subject of the eruptions present in various cases it becomes impracticable to draw conclusions of scientific value, neither is it easy to classify the different kinds of eruption to which allusion is made; in fact, there is reason to believe that too little care has been taken to identify eruptions observed, and to distinguish those of a specific character from such as are ordinary results of high climatorial temperature, or are produced by insects and other causes of cutaneous irritation. All that is made clear is the fact that in a large number of cases of endemic non-specific fevers, the presence of cutaneous eruptions of various kinds was noticed; when we read in the records of some cases that the presence of *enteric* eruption was observed after death, the presumption is that an error in diagnosis had been committed by the examining Medical Officer. Considering, therefore, the vagueness of description of eruptions observed in a considerable number of the cases here recorded, it is well in addition to the remarks in paragraph 4 of this report to refer to the remarks by Dr. Copland. According to him, petechiæ, vibices, &c., seen in malignant or putrid fevers may occur in the advanced stage of any fever, even of the more inflammatory or purely eruptive, when converted into an *adynamic* or *typhoid* state by climate, locality, race, or even improper treatment, or the peculiar condition of the patient.

(*B.*) *Condition of Iliac Glands.*—Judging from the reports to which I have had access in preparing these notes, the majority of Medical officers have accepted the presence of a diseased condition of the aggregate glands in the ileum, as constituting an essential characteristic of specific enteric fever. Unfortunately, details in regard to morbid conditions of other portions of the alimentary canal are either altogether wanting, or so imperfect, as to be valueless for scientific purposes, so that the following details must be taken simply for what they are worth, namely:—

(*a*) *Wellington.*—Of the 9 fatal cases recorded, simple congestion of Peyer's patches was observed in 2, namely, 6 of uncertain type but non-specific, and 14 adynamic remittent, non-specific. They were more or less extensively ulcerated in 1 irregular ague; 5 ardent fever, passing into heat apoplexy; 9 heat apoplexy; 10 and 11 endemic non-specific fever; 15 and 23 adynamic non-specific fever. In the latter case perforation was present.

(*b*) *Bangalore.*—Of 12 fatal cases congestion of Peyer's patches existed together with a similar condition of the solitary glands and of the cæcum in one instance, namely, 23 heat apoplexy; congestion of the enteric extent of the small and large intestines in 2, namely, 24 adynamic non-specific fever, and 27 ardent fever passing into heat apoplexy; ulceration of agminated glands alone in 1, namely, 34, the nature of the case uncertain, except that it was non-specific; ulceration of the agminated glands co-existed with ulceration of the cœcum in two instances, namely 1 ardent fever, and 35 nature of illness uncertain, except that it was non-specific; with congestion of the colon in 2, namely, 3, heat fever passing into heat apoplexy, and 26 typho-malarial fever; the condition of Peyer's patches was unrecorded in two; of these ulceration existed around the ileo-cæcal valve in 1, namely, 31 endemic remittent fever, in the second perforation existed in the lower part of the ileum, namely, in a case of endemic remittent fever; no *post-mortem* examination took place in three cases, namely, 4, 23, and 30.

(c) *Bellary.*—The only case treated at this station proved fatal. It was of ardent fever; particulars do not appear in regard to the condition of Peyer's glands, but it is stated that the colon was highly congested, its solitary glands implicated.

(d) *Secunderabad.*—Of 14 fatal cases no *post-mortem* examination took place in 4 cases, of which 3 were ardent fever and 1 uncertain in its nature; they were unaffected in 1, namely, of continued fever from exposure to the sun, but in it perforation took place in the intermediate tissue; congested but not ulcerated in 3, namely, 2 of ardent fever, and 1 of uncertain character; ulcerated in 6, namely, in 3 of ordinary ardent fever, perforation occurring in 1 of these, in 1 of ardent passing into adynamic or "typhoid," in 1 of heat apoplexy, and in 1 of phrenitis from the combined effects of drink and exposure to the sun.

(e) *Ramptee.*—Of the 2 fatal cases recorded no *post-mortem* examination took place in 1, namely, in a case of non-specific continued fever, in the other, namely, 1 of heat apoplexy, the record is so indefinite, that the precise state of Peyer's glands cannot be ascertained.

(f) *Cannanore.*—In 9 fatal cases the condition of the aggregated glands is unrecorded in 3, namely, 1 malarial fever and dysentery; 3 climatorial fever and enteritis; 21 ardent fever; and 34 climatorial remittent, ending in heat apoplexy; ulcerated in *three*, namely, in 7, ardent fever; 23 *enteric* fever, non-specific; 28 ardent fever passing into heat apoplexy; two of the patches ulcerated; of the remaining, tumefied in *one* case, namely, 42, malarial remittent fever, not ulcerated in *one*, namely, 5, malarial fever. In case 34 noted above, it is stated that the solitary glands were ulcerated.

(g) *St. Thomas' Mount.*—One fatal case, namely, of ardent fever; state of Peyer's patches indefinitely described.

(h) *Palaveram.*—One fatal case, namely, of non-specific fever, the mucous membrane over Peyer's glands congested.

(i) *Rangoon.*—One fatal case, namely, of heat apoplexy. State of Peyer's patches unrecorded.

(k) *Thyetmyo.*—Three fatal cases, namely, 1 apparently heat apoplexy and cholera, and 1, suspected dengue, 1 otherwise uncertain. In all 3 Peyer's glands were enlarged, but not ulcerated.

(l) *Port Blair.*—One fatal case, namely, by adynamic non-specific fever, Peyer's glands congested with commencing ulceration near the ileo-cæcal valve.

From these remarks the circumstance is, I hope, made clear that not only do pathological changes occur in the aggregated glands of the ileum in cases of specific enteric fever, as described by British authors, but that similar changes take place in the course of purely endemic forms of fever in India; also that similar changes are frequently found in cases where the progress of climatorial fever has been extremely rapid, and that in not a few instances they are attended by more or less extensive disease of other parts of the alimentary canal. A review of the records of autopsies however, leads me to the belief that whereas in former years attention was chiefly directed to the presence, or otherwise of morbid changes in the duodenum and upper part generally of the alimentary canal, so of late, attention has been too exclusively directed to the ileum; I trust therefore, that for the future, medical officers will recognise the importance of investigating morbid changes with equal care in whatever position or tissue they exist.

The conclusions thus obtained are singularly in accord with the evidence recorded in paragraph 13 of this report, and clearly indicate that the morbid lesions described, are not necessarily the result of specific poison received into the body. In this respect facts have so remarkably confirmed the views expressed by Sir Thomas Watson, that even while these pages are passing through the press, I deem it proper to transcribe some of his statements in regard to the subject in hand. "Now, the alterations I have been sketching,—the thickening, redness, tumefaction, ulceration or sloughing of the glands of Peyer, and also of the solitary glands, are so common in fever, particularly in some epidemics, that many pathologists are of opinion that fever is essentially inflammation of these glands, but this I am sure is an error." "But what is more conclusive is that the occurrence of this inflammatory condition of the mucous follicles of the intestine is not constant in continued fever." "We must conclude, upon the whole, that although an inflammatory state of the solitary and aggregate glands which strew the surface of the mucous membrane of the alimentary canal is not the essence of fever,—yet that it is a very frequent companion of continued fever.

GENERAL CONCLUSIONS.

40. Let the preceding records of individual cases speak for themselves. They include 175 of sorts as already remarked, out of which number, if my views are correct, only 7 approximate to the standard of typhoid fever according to British authors; while in not one instance has the disease been traced to pythogenic causes. If not traceable to specific causes, then it seems to me necessarily to follow that the disease has resulted from general influences, in other words, from endemic conditions affecting masses or individuals. It is indeed true that not

only with regard to causation but also to the phenomena of this form of fever, so great differences exist in the writings of various authors, that we in India may fairly doubt whether their descriptions apply to similar conditions. Suffice it to observe that, for purposes of comparison, the description of the causation and phenomena of the affection as given by Dr. Murchison is generally accepted, and being so, from the facts given, the conclusion seems inevitable that the standard so adopted is inapplicable with regard to this command. To my mind it is a matter of most serious importance that with regard to the disease in question, theories applicable enough to conditions in England and Europe generally have been insisted upon by eminent authors as having reference to conditions in India to which they are altogether inapplicable; and if the result of my investigations be correct, lives and health of soldiers have been in consequence sacrificed. It were as reasonable to deny the influence of endemic conditions in regard to the *fauna* and *flora* of this country as to deny the same influence arising from those conditions with regard to disease in man. In fact, the circumstance is well understood in India that domestic animals imported die of endemic affections much as do the human immigrants, nor are there many officers in this country who are ignorant of the way that English plants succumb to heat and other local influences. Mr. Shaw, Principal Veterinary Surgeon, informs me that in cases of the endemic fever among horses, named after Loodianah, the place where it was first described, the agminated glands are frequently involved.

But not alone in this command has the custom of late sprung up to designate as of enteric or typhoid fever cases of altogether different types. Nor do I consider it too much to observe that when diagnosis is at fault the treatment can scarcely be in accordance with requirements of a particular case. Here, for example, is the record of a case upon which in 1870 the allegation already stated was based that typhoid fever was not a disease new to India, but that its existence had in former years been overlooked. At pages 280 and 281 of the report for that year by the Sanitary Commissioner with the Government of India we find the circumstance recorded that on the 28th of April 1865 a soldier of the 104th Foot, then stationed in the fortress of Gwalior, was admitted into hospital with very intense fever, great prostration, and head symptoms; that no remission took place during a week, and that, according to the treating Medical officer, the general symptoms were those of *typhus*. In a subsequent report on this case the same Medical officer stated with regard to it that from *febris continua* the case proved to be one of *typhus fever*; and in a further report, dated 12th of May, a remark occurs with reference to it that "the case of *typhoid* fever (was) progressing favorably; unmistakeable signs of typhoid affection of the ileum, diarrhœa, characteristic evacuations, tympanitis and regurgitation set in." I could add records of other cases from official reports, but will not at present add to the bulk of this report. The case here related under these different headings proclaims itself to the Medical officer of practical experience as one of ardent fever, nor will he have difficulty in assigning the treatment most suitable to it. It so happened, however, that the Medical officer who had professional charge of the case was without Indian experience. And upon such a description is based the assumption that enteric fever had been overlooked by the older Medical officers.

Difference of opinion would of itself be a matter of small importance indeed; but when the stakes played for are the lives of British soldiers, it is time that one of the Medical officers whose professional capacity has been officially traduced should speak out, and endeavor to rectify evils that have thus arisen. To quote from Sir Thomas Watson, "we hear continually, both in and out of the profession, different species of fever spoken of. By the public, typhus fever, brain fever, bilious, putrid, low, nervous. And systematic writers are to the full as particular: mucous fever, ataxic, adynamic, gastro-enteric, and so forth. Now, admitting that fever shows itself under various forms, I am persuaded that the effect upon the mind of all this sub-division is bad and hurtful. It encourages a disposition already too prevalent to prescribe for a disease according to its *name*. There is *no* line of genuine distinction between continued fevers that can be relied on.

Were the present question a mere matter of difference of professional opinion, I should have discussed it departmentally instead of in this form. I consider

however that its bearings are so important in regard to military efficiency, and to works connected with sanitation of barracks and military stations generally, some of which have already cost large sums of money, that the appropriate course is to offer these views as I now do. Even as I revise these pages an illustration of what I here remark occurs in the Report of the Sanitary Commissioner with the Government of India for 1876. At page 27, the results of statistics of enteric or typhoid fever, as that disease is said to have occurred in this command are given. It is stated that in Bengal the admission rate from this disease for that year was 4·7 per 1,000, the death rate 1·75; in Madras 4·4 and 1·99 respectively; and in Bombay 4·3 and 1·86; that in Madras 38 out of the 49 cases of enteric fever returned in the Presidency occurred at Secunderabad, the number being equal to 16 per 1,000 of the strength, and 5 cases from Wellington in an average strength of 449. In reference to these particulars, the observation occurs in the report by the Sanitary Commissioner "that this great prevalence in certain stations of a disease so dependent on local insanitary conditions as enteric fever calls for close inquiry. One of the most unsatisfactory features of the subject is the increasing prevalence of this disease in the hill stations." The returns from which the above statistics with regard to this Presidency were prepared, were furnished through my own office, and no doubt in that sense I am responsible for them. At that time, although my attention had been directed to the present subject, I relied upon the correctness of returns sent to me by executive officers, and had not personally examined the records of individual cases for myself. This omission on my part has since that date been supplied, and with the results recorded in this document. I now turn to the list of cases at Secunderabad; I find that for the purposes of this report particulars are available for only 21 cases out of the 38 alluded to by the Sanitary Commissioner as having occurred at Secunderabad, and that, following the numbers of cases according to the list, the following are the results, namely :—1 was a case of ardent fever ending in heat-apoplexy; 2 indefinite, non-specific; 3 endemic fever, non-specific; 15 ardent fever; 16 ordinary continued fever; 17 ardent fever; 18 heat-apoplexy, 19 ardent fever; 20 indefinite, non-specific; 21 indefinite, non-specific; 22 continued heat fever; 23 phrenitis from drink and heat; 24 climatorial continued fever; 25 ordinary continued fever; 26 ardent fever; 27 ardent fever; 28 indefinite, but not typhoid fever; 29 indefinite, non-specific; 30 adynamic, non-specific; 31 indefinite, non-specific; 32 ardent fever; not one case of specific enteric fever really. At Wellington an analysis of the 5 cases reported in the first instance as of enteric fever, gives the following results, following the numbers in accordance with the list, namely :—8 irregular remittent, becoming intermittent; 9 heat, apoplexy; 10 endemic, non-specific; 11 endemic, non-specific; 12 endemic, continued fever; *none* of specific enteric. In so far then as the hill station of the Madras Presidency is concerned, the remark by the Sanitary Commissioner that "one of the most unsatisfactory features of the subject is the increasing prevalence of (typhoid fever) in the hill stations," is really inapplicable. And I am happy that such is the result of my inquiries.

In the summaries I have in preceding paragraphs given of cases of so-called typhoid, at particular stations, I have indicated that not only have different forms of fever been thus designated, but that other affections have been similarly included; of the former, every degree of severity, from febricula to heat apoplexy, from mild intermittent to the most severe remittent; of the latter, cases of hepatitis, diarrhœa, dysentery, and even some of bronchitis and phthisis. The impression left upon my mind is that the variety of affections all grouped *typhoid* by Medical officers is to a certain extent due to imperfection in the authorised nomenclature of endemic fevers laid down by the Royal College of Physicians; thus the expression "simple continued fever" used in that nomenclature is insufficient and misleading, and Medical officers naturally hesitate to enumerate under this heading cases of such severity as those of ardent fever of the hot season, in which the phenomena, far from being simple, are complicated, and often most serious from their first onslaught. Rather I would employ the nomenclature made use of by the older Indian Medical officers from their local experience of endemic fevers, and I trust this suggestion may be considered when next a revision takes place in nomenclature.

With regard to treatment, I consider that the preceding facts justify me in expressing my conviction that the *fashion* of the day being to refer every symptom to typhoid, the nature of measures employed has, in not a few instances, been in opposition to the indications of symptoms if interpreted by Medical officers of extended personal experience, and who have made themselves acquainted with the teachings of their prdecessors ; that in fact, cases have been, in some instances at least, treated more with reference to a name than nature of the disease present. A few examples will suffice : thus, according to my view, we find that stimulation has been used in cases where cerebral determination, flushed face, pungent heat of skin, and other symptoms indicated the necessity for depletion ; ipecacuanha has been administered in quantities sufficient to induce morbid action in the bowels, and such action being set up, the case forthwith treated as if it were specific enteric fever ; the symptom of high and variable temperature has been treated as if it were the disease itself ; and remedies have been administered in the absence of clear knowledge with regard to their therapeutic action. It is of course open to the younger Medical officers to say, these unwelcome remarks are matters of opinion. Granted so far that they are so ; but the opinions are the result of long Indian experience, and of not a little study of works of those who have preceded us ; perhaps, therefore, on these grounds, if upon no other, they merit some consideration. I trust also I may be permitted to solicit the attention of my brother Medical officers in the army to the importance of treating cases of disease of whatever nature according to well-established principles, instead of on that of simply administering particular remedies, for the mere reason that they are for the time being vaunted as *specifics*, for in the treatment of Indian fevers there are no such things. Rather let Medical officers be guided by the principles quoted from the French *Conseil de Santé des Armées*, in my Notes on the Hygiene of Cholera and here reproduced, namely : "*Point d'empirisme; il est indigne du vrai savoir et de l'habilité pratique ; point de dangereux essais sur les défenseurs du pays ; application methodique at consciencieuse des principes fondamentaux de l'art de guérir ; à cela se réduit le devoir du médecin militaire dans tous les cas.*"

I believe that the circumstance of my having entered upon the present inquiry has already had the effect of drawing the attention of Medical officers to the subject of typhoid fever as a specific disease, as well as to the subject of fever generally ; and I am further induced to hope that already good results have thus arisen. For example, a Medical officer of lengthened service thus writes : "I cannot shut my eyes to the fact that a certain looseness of diagnosis, if I may use the expression, has prevailed, and still I fear prevails on this point. I cannot but believe that many cases have been recorded as enteric fever *pur et simple* that were no more enteric fever than they were small-pox." Writing of Bangalore he adds, "I am inclined to think that enteric fever is a rare form of fever in this place. I am inclined to class the fever most frequently met with here as a continued fever of a very ardent type, modified by the previous habits of the patient." Surgeon-Major Tydd, a Medical officer of long Indian experience, thus wrote to me in March 1878 when on the eve of proceeding to England : "It is indeed to my mind a matter of great doubt whether typhoid fever should be recognised as existing at all as a definite specific disease, and I certainly do not think it has yet been conclusively proved that it does." At another station in this command I learn that Medical officers have become *very canny* about recording cases under the head of typhoid fever, which in other words means, I trust, that they pay more attention than heretofore to the phenomena of individual cases ; and that, to repeat the expression by Sir R. Martin already quoted, they select their measures with judgment and apportion them carefully. From the remarks extracted from annual reports it will also be seen that doubts have from time to time arisen in the minds of Medical officers as to whether the cases or outbreaks they were describing were after all of actual typhoid ; and a careful perusal of hospital case-books leads me to the conclusion that in proportion to the local inexperience of Medical officers so have the cases designated by them as of typhoid fever been numerous. In the records of cases I have frequently met with such remarks as that such and such a case began as continued fever, as remittent or as intermittent ; but in all such instances explanation is wanting as to why the disease thus manifest is ignored by treating Medical officers, and

one of specific nature assigned, regarding the causation of which no actual data were traceable.

A reference to the cases given for purposes of comparison in the early part of this report indicates that the train of symptoms which result from air or water rendered poisonous by organic contamination is in reality very different from the phenomena induced by high temperature, malaria, or other local conditions in India, although similar morbid changes occur alike from both sets of causes. If the question be asked, how comes it that so many cases are now designated typhoid fever as compared with former times, which on investigation prove to be the ordinary endemic form of disease? Various explanatory circumstances present themselves, each of which has its own degree of importance. The first and most weighty seems to me that for some years back Medical officers new to India, have not, so far as my inquiries have gone, had the benefit of the experience of their seniors in a direct and definite manner as happened when all being regimental officers, the influence of their seniors was also direct and defined; and I believe that in this way the continuity of actual experience has to a considerable degree been lost—a circumstance to my mind most regretable. Another probable explanation appears to me to be in the circumstance that typhoid fever being of late years much discussed by authors at home, the natural tendency on the part of young Medical officers is to follow the lead, as it were, in regard to their nomenclature of endemic forms of disease; nor is temptation wanting among those of them who read, to thus give a name which by implication assigns to themselves superior diagnostic powers to those of their seniors. But the reports before me indicate that another cause exists. I find that in not a few instances cases have been recorded under some of the ordinary headings of endemic forms of fever, but that after the death of the patient the nomenclature has been changed simply because the existence of disease in the ileum was discovered; the morbid changes here alluded to being necessary phenomena of non-specific endemic disease, as already fully shown in the course of abstracts of individual cases. At any rate I trust that a systematic inquiry may be instituted, and the correctness or otherwise of the views I have expressed in these pages fairly and honestly tested, the great aim and object of my remarks being the health and well-being of the soldier.

SANITARY REPORTS ON STATIONS IN RELATION TO TYPHOID OR ENTERIC FEVER.

41. In prosecuting my inquiry into the existence or otherwise of specific pythogenic fever among the British troops in this command, I submitted to the Officers of the Army Medical Department doing duty under my orders, a series of questions bearing upon the sanitation of barracks, stations, and their vicinity, with a view to elucidate, if possible, any connection which might exist between those conditions and that affection. In the pages which follow I give in the first place a transcript of the questions I thus submitted, and then abstracts of replies received, appending to each report the name of the Medical Officer furnishing it, so that all who have been so good as to aid me in my investigation may have credit for what they have done.

With a view to facilitate the inquiry now taking place on the subject of Typhoid Fever among British Troops, the fullest information under the following heads is requested in regard to the British Forces generally :—

Regiment. Stationed at. Date of Report.

1. Average strength of all the British troops, including officers, men, women, and children respectively at the station. The period for which the strength is calculated must correspond with the period referred to in paragraph 2. The exact period embraced to be clearly stated.

2. Total numbers by all causes admitted, died, and invalided during the past year or other available period, together with ratios per mille of strength per annum, giving each class separately.

3. A general description of barracks and all buildings connected therewith, the materials of which constructed, &c. Their site, exposure, &c. Have either had influence on the occurrence of typhoid fever; if so, give particulars.

4. Particulars in regard to cubic and superficial space per person in sleeping-rooms, stating whether the measurements include enclosed verandahs or simply the actual apartment occupied by the troops. If deficiencies exist, state them and give their cause, and how far these conditions have affected the occurrence of typhoid fever.

5. A description of the beds and bedding in use in barracks. Anything in their condition likely to cause or propagate typhoid fever.

6. Details regarding the means of ventilation. Anything in its condition likely to conduce to typhoid fever.

7. Whether urinals and night closets are provided. If not, how the necessities of the men in both respects are met. Whether injury arises from the nature of existing arrangements. If so, the measures proposed to remedy the defects. How far existing conditions are considered to have affected the occurrence of typhoid fever.

8. The nature of day privies and urinals in use. If any defects exist, state what they are. Anything in their condition likely to induce typhoid fever.

9. Description of the lavatories, stating the kind of basins used, their number and proportion to strength of the troops. How and whence is water for them obtained. How disposed of after use. If baths exist, similar information regarding them. Anything in connection with this subject likely to induce typhoid fever.

10. Scavenging, drainage and sewage of barracks and other buildings. How such matters are disposed of. Description of vessels or receptacles in which they are temporarily received. Are the troops exposed in any way to sewer gas in water or air? Have these conditions had any influence upon the occurrence of typhoid fever?

11. Description of flooring in barracks and other buildings, viz., whether it consists of wood, stone, asphalte, &c. Anything in these conditions likely to induce typhoid fever.

12. Water-supply for barracks, sources whence obtained, liability or otherwise to organic pollution. The kind of filters used in barracks and remarks thereon. Anything in connection therewith likely to give rise to typhoid fever.

13. The nature and sufficiency or otherwise of the family quarters and buildings connected therewith. Anything in connection with them calculated to give rise to, or propagate, typhoid fever.

14. The suitability or otherwise of the reading and recreation rooms. Whether any circumstance in connection with them is believed to have conduced to typhoid fever.

15. Similar information regarding the canteen and buildings and places connected therewith.

16. The drinks and other supplies obtained. Remarks upon these in relation to the hygiene of the troops, and especially in relation to typhoid fever.

17. If coffee-rooms exist, their nature. Whether they are much resorted to. If so, the hygienic result. Has milk or any other article of food sold in such places conduced to enteric fever.

18. If workshops exist, their influence upon the health of men using them. Anything in connection with them calculated to induce enteric fever.

19. Sufficiency or otherwise of school accommodation. Anything in relation to it likely to conduce to typhoid fever.

20. Vicinity of barracks or station, the nature and sufficiency of its conservancy. General sanitary supervision of the station. Any circumstance connected therewith likely to conduce to typhoid fever.

21. Do soldiers' gardens exist? If so, are they resorted to? Anything connected with them calculated to induce enteric fever.

22. Means of out-door recreation, and its effects upon health. Nature of duties performed by the troops. Are they much exposed to the sun? Number of nights in bed. Anything in connection with these matters likely to induce typhoid fever.

23. Quality of rations and means of cooking. Anything in either likely to induce typhoid fever.

24. Remarks upon the neighbouring bazaars in relation to their effects upon the health of the troops. If soldiers are believed to have contracted typhoid fever there, state in detail all circumstances connected therewith.

25. Sanitary effect of the Contagious Diseases Act at the station. Whether enteric fever has been traced to association on the part of soldiers with prostitutes or visiting brothels.

26. Hospital, its construction and accommodation, sufficiency or otherwise, its ventilation, &c., and space per patient. If cases of enteric fever have originated in hospital, please to give all particulars.

27. Special wards. Their suitability. If such have been used for patients with typhoid fever, detail the conditions which indicated the propriety of isolating them.

28. Accommodation for hospital staff and attendants. In so far as this has a bearing, if any, upon the occurrence of typhoid fever.

29. Suitability and description of bedding, clothing, and stores. Whether typhoid fever was propagated by means of either.

30. Latrines and conservancy. Whether typhoid fever has been traced to either. If it has, please enter into full details.

31. As to the prevalence of any particular diseases, mortality, &c. The exact statistics of typhoid fever during the period referred to at paragraph 1, and to what cause considered to have been attributable.

32. Statement of other subjects in connection with the etiology of typhoid fever, to which the attention of the Surgeon-General is desired specially to be drawn. Please state views in regard to the following points :—

(*a*) Has "typhoid fever" as observed in the above named station among British soldiers arisen from specific causes, *i.e*, from fæcal contamination in water, food or air; (*b*) from a specific poison, or (*c*) as a result of endemic or climatorial influences of non-specific nature.

In the following replies it has been deemed advisable to note simply the number of the query to which the remarks refer. In this way repetition is avoided as much as possible, and bulk reduced,—a matter of consideration in a report such as the present, namely :—

42. WELLINGTON.

Invalid and Convalescent Depôt.

1. From 1st January to 31st December 1877 :—

	Officers.	Men.	Women.	Children.
Strength	13	528	88	220
2. Admitted	14	937	134	148
Died	...	15	3	18
Invalided	...	78	...	...
Ratio per 100 strength per annum :—				
Admitted	1,029	1,771	1,522	672
Died	...	28	33	81
Invalided	...	147	...	...

3. The barracks, six double-storied buildings, enclosing a parallelogram which is used as a parade ground. They are built of brick and mortar, are divided above and below into two long sleeping rooms, each of which will accommodate 35 men. Their site is on the spur of one of the hills running east and west, about 6,100 feet above the level of the sea. They are sheltered by higher mountains and do not receive the extreme of either of the monsoons. Their foundations are indifferently raised from the ground; only a space of 18 inches between the flooring and the ground itself. Behind each of the barracks are the out-houses, consisting of latrines, ablution-houses, &c.; neither the site, situation, or position of the barracks or out-houses, has in my opinion, had any influence on the occurrence of cases of typhoid fever.

4. Cubic space per man 1,145·5 feet, superficial area 76·12. This does not include enclosed verandahs. I do not consider this has in any way affected the occurrence of typhoid fever.

5. Straw in palliasses of canvas, changed once a quarter, two blankets, sheet, pillow, &c. I do not consider anything in their condition has been the cause of typhoid fever.

6. Ventilated by windows, doors, fire-places, apertures leading from the bottom under the verandahs in the lower stories; and in the upper stories, in addition, by swing windows. I do not consider there is anything in the ventilation to account for the typhoid fever. It has been sufficient, the air being constantly changed, for the number of men sleeping in the room.

7. Night urinals are provided in the upper verandah of the sleeping room. The men go to the latrine, if necessary, at night; no inquiry has arisen from the arrangement, nor do I consider these conditions have affected the occurrence of typhoid fever in the Depôt.

8. Masonry buildings reached by covered ways from the barracks; each seat is separated from the adjoining one; the pans fit close up: dry-earth is used. The urinals are situated in the front of the latrine building, have a separate entrance, and are suitable. I do not consi-

der any defects exist, nor anything in the condition of the privies or urinals has induced the typhoid fever.

9. The lavatories are separate buildings of brick and mortar. Each consists of two rooms with a centre masonry table in each for placing the basins on. Each man in the Depôt is provided with a basin; water is laid on by pipes and drawn by taps, obtained from a reservoir on the slope of the hill to the eastward, is sufficient in quantity and good in quality for the purpose. It is conveyed away after use by masonry channels, carrying it over the slope of the hill. Private baths exist at either end of the lavatory building, where half cask tubs are placed, and water is also laid on here. I do not consider that the lavatories have been in any way the cause of typhoid fever.

10. Sweepings of the barracks and vicinity are carried into ash-pits and removed by cart. The drainage, open surface masonry channels connected with deeper seated trapped drains, which carry away all surface water. From the situation the drainage is natural, water does not lie after rain, all falls over the slope of the hill and into mountain streams. Sewage is also conveyed away through the open masonry channels, being assisted by hand sweeping, and the vicinity is kept clean. The sweepings, ashes and rubbish are carried away by carts and deposited in pits at some mile and a half from the barracks. The receptacles in which they are received at the barracks are iron, and used only temporarily. I do not consider that sewer gases can have affected or in any way caused the typhoid fever. In 1876 there was a lad of the 1-21st Regiment, Private Robert McDowell, who died of typhoid fever after having been employed in one of the cook-houses in which the water-tap was connected with deeper trap drain, and it was thought at the time sewer gases might have escaped through the pipe into the cook-house, but this was not proved satisfactorily. I am of opinion that the conditions connected with the drainage, &c., from the barracks has not had any influence on the occurrence of typhoid fever.

11. The flooring of all the barracks is wood; that of the urinals and ablution houses stone; that of the latrine earth. No condition here is likely to have induced typhoid fever.

12. From two sources. That for drinking and cooking purposes from a spring from rocks underneath the mountain to the east and north of the barracks. There is no liability of this becoming polluted from organic matter. It is of an excellent description and sufficient in quantity. The other source is for the wash-houses, and is obtained, as said before, from a reservoir on the slope of a hill to the eastward. It is the surface drainage of the hills, and is not suitable or intended for drinking purposes. The filters consist of the three chatty with sand and charcoal, very primitive, but answer the purpose fairly well. I do not consider that anything connected with the water-supply of the barracks has induced typhoid fever.

13. Cubic space 4,992, superficial area 584 per person. Four blocks of masonry buildings with an upper and lower storey, each family having two rooms. They are sufficiently well situated and suitable. The front room is fairly ventilated, but the back room badly; still I am not able to trace anything connected with them calculated to give rise to or propagate typhoid fever.

14. The reading and recreation rooms are suitable; nothing connected with them is insanitary.

15. The canteen is an isolated building, suitable; nothing connected with it can have produced the typhoid fever.

16. The canteen drinks consist of beer and porter only; their quality has been good, and nothing has been connected with them to cause typhoid fever.

17. There is a coffee-shop, which, during the time the Depôt was full, was much resorted to. Milk is not sold here, nor do I consider the food supplied can have tended in any way to produce enteric fever. All milk sold at the Depôt is tested at the hospital.

18. Workshops exist, and have been of benefit to the men using them. Nothing in connection with them has affected enteric fever.

19. The accommodation of the school has been sufficient, consisting of cubical space 375·37, superficial area 14·10 for adults, and 162·90 cubic space and 10·110 superficial area for infants.

20. The conservancy of the station is by a cart going round to each compound, carrying away the night-soil; it is sufficient. The general sanitary supervision of the station has been satisfactory, and no circumstance connected therewith has conduced in any way to typhoid fever.

21. Soldiers' gardens exist and are much resorted to by the men: nothing connected with them has been calculated to induce enteric fever, although one fatal case of cholera, Private Bulwer, 33rd Regiment, was traceable to exposure and great intemperance while employed in working at his garden.

22. There is very little means of out-door recreation at the Depôt, except working in the gardens. The men play skittles, fives and cricket, and it has no doubt had a beneficial effect on their health. At the same time, a large proportion of the young soldiers who contracted febricula, I consider were exposed to the influence of the sun and malaria poison while walking

in the valleys between the hills about, but I am not able to trace anything directly causing typhoid fever. The duties of the troops have been light, consisting of guards, fatigues and ordinary parades. They have not been much exposed to the sun. The number of nights in bed has been on the average 11·5, and of the 11 cases of typhoid fever, seven commenced with febricula from exposure and one with simple continued fever; so whatever the specific poison was causing the high fever, headache, quick pulse, and other symptoms of febricula, and nearly always associated with head symptoms, as if from exposure to the sun, induced as a sequence, in these young soldiers, the attacks of typhoid fever.

23. On the whole good. There has been sufficient vegetables, and nothing connected with them has been likely to induce typhoid fever.

24. The bazaar is situated on the slope of a hill and is kept clean and in a good sanitary condition: there has been a good deal of sickness and mortality among the natives occupying it, said to be caused by fever and bowel complaints, which I am inclined to think is due to the impure water-supply, it being surface drainage water and containing a large amount of organic sediment. The men resort here, but I do not feel justified in stating that any cases of typhoid fever could be traced to it in any way.

25. The sanitary effect of the Contagious Diseases Act at the station has been during 1877 the decrease of admissions as compared with 1876, and the venereal disease has been of a less virulent type. I do not consider enteric fever can be traced to the prostitutes with whom the soldiers have associated on visiting their brothels.

26. The hospital is a masonry building of brick and mortar, situated on an isolated hill, well open and ventilated, will accommodate 70 men and 7 women under ordinary circumstances the men's accommodation is sufficient for the Depôt (the women's totally insufficient), but this year, during the large number of fever cases, was totally insufficient, tents being required to supplement the accommodation. The wards are airy, ventilated by doors and swinging windows; it would be better if ridge roof ventilation were supplied and additional windows opening into the front verandahs. One case of enteric fever occurred. Private Foice, 45th Regiment, was under treatment for 14 days in the hospital for broken rib, when he was attacked with high temperature ranging from 101 to 103, stools alkaline and gurgling in iliac fossa, with rose-colored lenticular spots on abdomen and back. There was nothing at the time insanitary connected with the hospital. The case commenced as one of ordinary febricula, the man had not been associated with any person suffering from typhoid fever, the drinking-water was good, the latrines were satisfactory, the drainage excellent. The cubic space per patient in hospital was 3,815, superficial area 142; this was never decreased, for as the accommodation became insufficient, tents were pitched and the sick placed in them.

27. There are three special wards connected with the hospital, are very suitable, and were always used for the treatment of typhoid patients, or they were treated in tents; for although there may be no direct danger from a typhoid patient being placed in a ward with others, still as the stools are liable to give off poison, especially while undergoing fermentation, it was always considered advisable to isolate the patient; also it could be insured that he received greater attention when separated. During the treatment of the cases, the men were invariably attended by their comrades from barracks, the duty being counted as a guard, no person being kept beyond the 24 hours, and in no instance did sickness of any kind follow.

28. There is no accommodation for hospital staff at the hospital, except the Hospital Serjeant and one room for orderlies. This in no way could have influenced cases of typhoid fever.

29. The hospital bedding and clothing used has always been removed when soiled and kept separate until disinfected and fumigated. This has been done for fear any of the evacuations should have generated a poison, which might have caused other cases, and in no instance have any ill-effects been propagated by this means.

30. The hospital latrines are on the dry-earth principle; the soil is removed into separate receptacles and carried away by cart. Typhoid fever has not been traced to this in any way.

31. There was a great prevalence of febricula, particularly among the young soldiers, caused by exposure to the sun and a malarial specific poison thought to be generated from decaying vegetable matter in the valleys in the vicinity of the station, considered to be due to the failing of the monsoons: this decaying matter not having been washed away, had undergone decaying changes. There was no mortality from febricula, although seven of the cases admitted with this disease ran on to typhoid, and in one death occurred, Private Jeyes, 33rd Regiment. The disease appeared insidious, the fever becoming of a continued type with remissions, the patient gradually becoming weaker, with relaxed bowels, fulness of the abdomen, lenticular rose spots, gurgling, &c., &c., and that condition known as "typhoid," with sordes and black tongue, and in some cases with delirium, and in nearly all head symptoms characterized the particulars of the cases.

32. I have carefully considered and sought for a cause of typhoid fever in the barracks, drainage, water-supply, rations and general sanitary conditions, but have been unable to trace any of the eleven cases of typhoid fever to anything connected with a specific known poison

from fæcal contamination in water, food or air. I believe the cases to have been the result of endemic climatic influences, particularly aggravated during the past year by the meteorological circumstances shown in the deficient rainfall and its consequences before alluded to.

(Signed) W. H. CORBETT, M.D.,
Surgeon-Major, A.M.D.

12*th March* 1878.

43. BANGALORE.

a. 14*th Hussars.*

1. From 1st January to 31st December 1877 :—

	Officers.	Men.	Women.	Children.
Strength	22	443	54	130
2. Admitted	33	497	57	55
Died	...	10	2	4
Invalided	1	27	1	...
Ratio per 1,000 per annum :—				
Admitted	1,466	1,119	957	421
Died	...	22	33	30
Invalided	44	60	16	...

3. Five blocks of barracks, each of a single storey, built of brick with stone foundation, divided into three rooms, with an inner and outer verandah; at each end two serjeants' rooms and a small room in addition for bathing. The guard-room is an upper-storied building with a lock-up and prison room, a verandah in front and behind, a stone staircase on the outside. The latrine is 25 yards in the rear. The orderly room also upper-storied; the stair is inside, and the ground-floor is used as a store room. Facing the orderly room is the canteen, it has a tap-room and a corporal's room at either end; the coffee-room occupies another room in the building, around which there is no verandah. The serjeants' mess is an upper-storied building of brick, with stone pillars supporting the verandah; two large rooms below, one a dining room, the other for recreation; at the end a small apartment for the mess waiter. The upper storey is used as a theatre and ball-room; at the end there is a room for the librarian and one for books. The kitchen is supplied with a stove, which the native cooks decline to use. There are two cook-houses for men, but only one in use. It consists of two buildings with an enclosed courtyard; the cooking is according to the native method, and is approved by the men. There are four latrines for men, each having 9 seats, furnished with iron enamelled pans, a box for dry earth, and a scoop; one serjeants' latrine with 8 seats; band latrine with 6 seats; 1 regimental school with 4 seats; 1 for guard-room, all supplied with pans, &c. Apparently not.

4. Cubic space per man 1,921 feet, superficial area 87 including enclosed verandahs. No evidence of any influence.

5. One English blanket, one pair cotton sheets, one carpet or settringe, and 1 palliasse washed quarterly and re-stuffed with clean straw once in three months. No.

6. Each barrack-room has 38 doors with windows over each, and 40 ventilators in upper part of walls and gratings below. No.

7. Urinals are provided at night outside each barrack-room and removed in the early morning. No closets. The latrines are not far. Nothing in these arrangements has apparently had any influence.

8. The latrines constructed on dry-earth system with screened compartments, and shed for filth carts and iron receptacles in the rear. There are 24 urinals, iron, with trays painted with coal-tar frequently.

The establishment connected with the above consists of 2 filth carts, 20 toties and 21 sweepers, under supervision by a soldier. No defects exist. No defects, with the exception possibly of the means of removing urine referred to in paragraph 10.

9. There are two bath-rooms with a stone slab for basins, and 4 separate compartments, in each of which is a tub to which water is laid on by pipes and a tap. There is also a plunge-bath, which is used by the men at certain hours under supervision of a non-commissioned officer. The water is supplied from the Ulsoor water-works; each man is provided with a metal basin. The disposal is by surface drainage, and nothing apparently is likely to cause typhoid.

10. Filth carts are used to remove night-soil, &c., twice a day, and air-tight iron receptacles, painted with coal-tar, are provided to receive ordure, &c., temporarily until removed. The urine receptacles are more or less offensive, although frequently cleaned and purified. No, but there is always a strong smell of ammonia from the urine receptacles. Whether it is possible that it may induce typhoid I cannot say, but think not.

11. Barracks, canteen and family quarters stone flooring; guard-room, upper storey, brick and plaster; lower storey, orderly-room, upper and lower storey stone: serjeants' mess, upper storey, wood, lower stone. None.

12. From Ulsoor water-works; the water is here purified, filtered, and conveyed by pipes to the different localities, and is said to be pure, the water is taken from these pipes and placed in chatty filters by puckallies. Tripod stands constructed of iron and bamboo, with earthen chatties, are used for filters in barracks: the upper chatty contains charcoal and sand, the centre charcoal and sand, the lower filtered water for drinking and cooking purposes. The chatties are frequently cleaned, the sand and charcoal washed, and a new supply frequently added. I think the filters satisfactory. I object to the system of puckallies, as it is next to impossible to keep their leather bags clean. Every precaution is taken in keeping filters, &c., clean and in good working order.

13. The family quarters consist of 4 blocks; there are 15 separate quarters in each, and each quarter consists of a sitting-room, bed-room, bath-room, cook-house and latrine. Nothing.

14. Suitable. All the leading English and Indian papers and magazines are supplied. The recreation room is of much benefit. It keeps good and steady men from the canteen and other temptations; cards, draughts, billiards, &c., are provided. Nothing.

15. Suitable. Nothing.

16. One quart of malt liquor, whether porter or ale, and one dram of arrack is allowed for each man daily. All good. I am of opinion that the dram of arrack or raw spirit is calculated to produce a tendency to drunkenness, especially in young soldiers new to the country, and would far sooner see an extra pint of malt-liquor issued in its place. I have no further remark to offer.

17. The supplies sold in the coffee-shop by the native contractors are good. Each man has a cup of tea or coffee issued to him free of charge on Fridays and other field days, and nearly every man of the regiment buys one or the other every morning. I consider this to be of the greatest importance, and attribute the good health of the regiment in a great measure to this ordinary precaution; bread, tea, sugar, coffee, salt, pepper, cigars, cold meat, &c., can be obtained. Thinking it possible that the milk might be the cause, I have arranged for some time past to have the cows brought to barracks and milked in presence of a non-commissioned officer. I have not been able to trace the disease to this source.

18. There are two workshops, one used by the saddler, saddle-tree maker, shoe-maker and master tailor, and the other by the armourer serjeant, and are not prejudicial to health. Nothing.

19. Accommodation ample. Nothing.

20. The barracks are situated on the old race-course; conservancy satisfactory. General sanitary supervision of the station is not as satisfactory as it might be. The bazaars and native town are not as satisfactory with regard to sanitation as could be wished, but the occurrence of typhoid has, in no instance, been traced to that source.

21. No. Nothing.

22. There is an open air gymnasium, parallel bars and ladders, &c., one racket-court, one skettle-alley, two bowling alleys, but little used. Cricket is the chief amusement, not prejudicial to health. Tent pegging and athletic sports frequently. The duties of the men are those usual in a cavalry regiment. The men are exposed as little as possible to the sun and care is taken about proper covering. The number of nights in bed is satisfactory, and I can trace nothing likely to induce typhoid fever under this head.

23. Each man has the following rations: meat 1 pound, bread 1 pound, potatoes 8 ounces, rice-flour 4 ounces, vegetables 8 ounces, tea $\frac{5}{7}$ ounce, coffee $\frac{10}{7}$ ounce, salt $\frac{2}{3}$ ounce, sugar $2\frac{1}{2}$ ounces, firewood 3 pounds. The primitive native method of cooking obtained. Nothing.

24. The men, women and children are forbidden to go to the bazaars during the prevalence of epidemic diseases, and at all times are kept out of them as much as possible. As stated in paragraph 20 I cannot trace the occurrence to this source.

25. The working of the Contagious Diseases Act is unsatisfactory; there are numbers of women who frequent the nullahs and bye-ways and spread the disease with impunity. 103 cases of primary syphilis were admitted since 1st January 1877 and 44 for gonorrhœa, 1 death occurred. No.

26. The Cavalry Hospital is an upper-storied building, containing on the ground-floor two large wards, with one small ward and one guard-room with verandah around it. Lavatory and latrines well elevated, built of stone; on the upper storey, reached by a flight of stone steps, are two large wards, with lavatory, latrine, &c., and a room at the end for an office, and a broad verandah runs around the whole of it, and the flooring of both verandah and wards is of asphalte. Nothing could be more satisfactory; the ventilation is particularly good. Regulated space per patient cubic feet 1,560, superficial feet 97. None.

27. There is a contagious or separate hospital close to the kitchen, generally used by the Female Hospital for contagious diseases; contain four separate wards. The cases have been

treated in the small ward of the hospital with a view to greater quiet, more room for the orderlies, and the prevention of contagion if it exists.

28. Apothecaries' and Hospital Serjeant's quarters are immediately behind the hospital. No accommodation for attendants. No bearing.

29. Bedding: coir mattresses, counterpanes, blankets and cotton pillows. Clothing: flannel banians and serge trowsers, cotton shirts and drawers, flannel and serge coats, worsted and cotton socks and slippers, commissariat and meal stores good. All found suitable. No.

30. The dry-earth system is carried out in the latrines; there are 8 separate compartments with enamelled pans and scoops for earth; two iron urinals are placed in the corner compartment, and iron receptacles with covers fitting into a projecting lid containing water to prevent smell. Conservancy the same as barracks; establishment six toties and three sweepers. Has not been traced.

31. Venereal disease, chiefly primary syphilis, has been terribly prevalent. Two fatal cases of cholera in February last. Seven cases altogether of typhoid, three fatal, and I am at a loss to find the cause.

32. The prevalence of venereal disease. I do not think the disease has originated from fæcal contamination in water or food; the habit of natives of performing the offices of nature in the nearest nullah of course exists to a certain extent, whether with any result of this sort I cannot say. I am of opinion that the disease is the result of endemic influence. Whether the *materies morbi* is specific I am not sure, but I think not. Were there any causes for malarial disease, such as marshes, swamps, &c., in the neighbourhood, the fact of the splenic complication might point to that source, but there is apparently absolutely none. The number of cases which have occurred in the regiment is small, and as I before stated, I am at a loss to find a cause.

(Signed) A. C. GAYE,
Surgeon-Major, A.M.D.

19th March 1878.

b. Royal Artillery.

1. From 1st January to 31st December 1877 :—

	Officers.	Men.	Women.	Children.
Strength	21	519	84	196
2. Admitted	15	560	89	77
Died	...	7	2	6
Invalided	...	18	5	16
Ratio per 1,000 strength per annum :—				
Admitted	705	1,077	1,050	392
Died	...	13	23	30
Invalided	...	34	58	81

3. The barracks consist of large one-storied buildings with double verandahs, built of brick, the floor of stone. Those occupied by the Royal Horse Artillery are rather low and somewhat too close to the Ulsoor bazaar and native followers' villages; those by the men of the Field Batteries are on a fine open space, formerly the old race-course. The difference of position of these barracks does not appear to have had any influence on the occurrence of typhoid fever.

4. In Royal Horse Artillery cubic space per man 2,684 feet, superficial area 56·58; Field Battery 2,384 and 68·18. This measurement includes one verandah occupied by the men in each block. These conditions have not affected the occurrence of typhoid fever.

5. Canvas bed cover filled with straw, changed every three months, a blanket, pillow, two sheets and rug. Nothing in these to cause or propagate typhoid.

6. The means of ventilation consist of doors, windows and ridge ventilation of roof; it is ample and satisfactory. There appears to be nothing as regards the ventilation of the barracks to conduce to typhoid fever.

7. Night urinals are provided, but no night closets. The men use the ordinary latrines night and day; these are not inconveniently far from the men's rooms.

8. The latrines are on the dry-earth conservancy and answer excellently well. The urine is removed in wooden barrels, these occasionally smell offensively; the solid excreta are temporarily received and eventually removed in air-tight iron receptacles; the urine remains in the urinals till removed in the wooden receptacles. No injury appears to be caused by the present arrangement, but I consider it would be desirable to substitute a metal or enamelled receptacle to remove the urine and thus avoid the offensive ammoniacal odour now given out.

9. There are four lavatories for the men, well lighted and ventilated. Each man has his own basin of galvanized iron; to these lavatories bath-rooms are attached and water is laid on to all. The water is obtained from the Ulsoor tank and is run off when used in stone drains,

the chief defect is the paucity of taps. There is a plunge-bath in each barracks, but from the scarcity of water these plunge-baths are not always available. It does not appear that anything connected with the lavatories could have any influence in the occurrence or propagation of typhoid.

10. Reference has already been made to the removal of the sewage ; the scavenging and sweepings of the barracks are in stone dust bins and removed daily in open carts. The troops are not exposed to sewer gas in water or air, as far as can be made apparent. The barracks are kept so scrupulously clean that I do not think any of the conditions connected with the scavenging of the barracks has anything to do with the occurrence of typhoid.

11. Stone flooring throughout. No.

12. The drinking-water is derived from wells at Agram beyond the hospital; it is considered good water and undergoes filtration in the three chatty filters before use. Water for other purposes is obtained from the Ulsoor tank by means of the water-works. I am not in a position to state how far the water from the wells at Agram may be polluted by organic matter, but as regards the Ulsoor tank it appears to me to be the very dirtiest and foulest in the whole of Bangalore, and if the occurrence of typhoid fever is to be traced to the use of water contaminated by organic matter, it is not unlikely that the water from the Ulsoor tank has something to say to it.

13. The family quarters are good and sufficient; nothing objectionable.

14. Recreation and reading rooms suitable.

15. Canteen unobjectionable.

16. The drinks supplied at the canteen are good and wholesome.

17. The coffee-room is attached and is greatly resorted to. No enteric fever can be traced to the use of milk obtained here.

18. There are no workshops except those of the artificers. They do not exercise an unhealthy influence on the health of the men.

19. The school accommodation is insufficient; this has been frequently reported, and I am given to understand that a new school-room is to be built. The limited space and crowded condition of the present school-room cannot be healthy, but I am not in a position to state that it has conduced to any outbreak of typhoid fever.

20. The conservancy and general sanitary supervision of the vicinity of the barracks are in the hands of the municipal authorities, and are capable of considerable improvement.

21. No soldiers' gardens.

22. Cricket, foot-ball, fives courts and occasional sports afford ample means of outdoor amusement, and have a very favorable effect in preserving the health of the men. The duties of the troops are those common to gunners and drivers employed with Field Batteries; they are not over exposed to the sun. Number of nights in bed 5 and 6. There is nothing in the duties or amusements of the men to induce typhoid fever.

23. The quality of the rations is very fair; the cooking is conducted by natives, and is certainly capable of improvement, but I cannot state that anything exists as regards these points likely to induce typhoid.

24. The immediate proximity of the Ulsoor Bazaar to a portion of the barracks is undesirable, but I am not sufficiently acquainted with the cases of typhoid that occurred in the Royal Artillery to be able to point out any connection between the two.

25. I consider the Contagious Diseases Act works indifferently at this station, but I do not think any cases of typhoid fever can be traced to the association of soldiers with prostitutes.

26. The hospital is a palatial two-storied building of stone with open verandah all round. It is admirably ventilated and affords ample accommodation for the sick. The cubic space per patient has been 3,266 feet and superficial 206·48 exclusive of verandahs. No cases of enteric fever, as far as I am aware, have originated in the hospital.

27. There are separate rooms at each extremity of the building, which are employed as special wards when occasion requires. I am not aware if they were used for the treatment of typhoid cases which occurred in the Royal Artillery.

28. The accommodation for hospital staff and attendants is inadequate and inconvenient. This has no bearing as to the occurrence of typhoid.

29. Bedding, clothing, and stores all good, suitable; in no way tending to propagate typhoid.

30. Latrines at the extremity of the building. Dry-earth conservancy. Typhoid fever has not been traced to their presence.

31. In 1877 five cases of enteric fever were admitted; 4 died. I have no data on which to give any information as regards these cases.

32. I regret I know nothing of the cases of typhoid fever that occurred in the Royal Artillery Hospital last year, nor have I any records by me at the present to enable me to draw any inference or make any statement in answer to this question.

(Signed) J. B. COCKBURN, M.D.,
16*th March* 1878. *Surgeon-Major, A.M.D.*

c. 67*th Regiment.*

1. From 4th February to 22nd March 1878:—

	Officers.	Men.	Women.	Children.
Strength	16	653	79	155
2. Admitted	5	80	6	11
Died	...	1	...	1
Invalided	...	...	...	...

Ratio per 1,000 strength per annum:—

Admitted. }
Died. } The period too limited for reliable conclusions.
Invalided. }

3. Nine parallel blocks, each block of one long room with a verandah on either side, at each end two rooms for serjeants. The direction of the building nearly north and south. The cook-houses about 20 yards from southern end; at about 150 yards from the northern end the quarter for families, the recreation room, library, &c. The latrines are in the west side of the barrack square; between each two barrack rooms is a urinal. All buildings are composed of stone and brick. No typhoid.

4. Cubic space per man 2,212 feet, superficial 96 inclusive of verandahs. No effect on typhoid fever.

5. Iron bed stands, straw mattresses, &c. No.

6. Barrack rooms quite open; ridge ventilation, and windows in upper part of the wall. No.

7. A urinal between each two barrack rooms, for other purposes the men have to go to the latrines. Present condition could hardly influence occurrence of typhoid fever.

8. The privies are on the dry-earth system; are clean and well attended to; the urinals consist of corrugated iron enclosures containing each an iron urine tub. No.

9. The lavatories consist of narrow rooms about 30 feet long, with a bench for basins along one side: the basins are of block tin, and each man has one for himself. The water is supplied by pipes and taps to each wash-house from the Ulsoor water-works; after use the water passes by open drains through the barrack square and into the main drain of the station. There are two swimming-baths, which are used to a fair extent by the men: the water after use is disposed of as above. No.

10. The soil from the latrines is carried away in carts provided for this purpose, and disposed of in the open country some three miles away from barracks. All the drains in barracks are open and conduct the sewerage matter into the station main drain, which passes close outside the barracks; the vessels in which the sewerage is temporarily received are iron tubs with covers supplied to be air-tight. The troops are not exposed to sewer gas properly so called, the contents of the open drains being only water from the wash-houses and slops from the married quarters, and such like matters. No.

11. All the floors in barracks are of stone. No.

12. The water is supplied from the Ulsoor water-works. With regard to the liability of the water so supplied to pollution with organic matter, it certainly must be so polluted to a considerable extent. The water of the Ulsoor lake is the surface drainage of many square miles of country, which is led to the bed of the lake by means of stone drains: no doubt but that the open country is contaminated with human excreta, and one has only to see the drains leading to the lake during the dry season to know that they are so. The filters used in barracks are the common three-chatty filters, the only use of which, in my opinion, is that of strainers for the suspended matter in the water. No doubt that if typhoid excreta get into the Ulsoor lake water, such a state of things is likely to give rise to enteric fever.

13. The family quarters and buildings are good, commodious, and in good sanitary condition. No.

14. Suitable. No.

15. Suitable.

16. The drinks and supplies in the canteen are good.

17. A coffee-shop is attached to the canteen; it is much used. No.

18 There are workshops in barracks, but their influence on health is not very apparent. No.

19. Good and sufficient school accommodation. No.

20. The conservancy of the vicinity of the barracks is fairly good for an Indian station. No.

21 No.

22. Means of recreation of the men at cricket, rackets, ball, &c., &c., are provided; the men use them, and no doubt but that their influence on health is excellent. The duties of the men are those usually performed by an infantry regiment. The men are not much exposed to the sun. Number of nights in bed 5. No.

23. Good; usual native kitchens. No.

24. The effects of the neighbouring bazaars on the health of the men, except as regards venereal diseases, are not very apparent. No soldier contracted typhoid fever there.

25. The regulations of the Act, judging from the number of venereal cases in hospital, are not very well carried out. No enteric fever has occurred.

26. The hospital accommodation is good and sufficient. The ventilation and sanitary condition good: cubic space per patient 2,135, superficial 92 feet, including enclosed verandahs. No.

27. No special wards have been used for typhoid cases.

28. This has no bearing upon the occurrence of typhoid fever.

29. Suitable.

30. The latrines are on the dry-earth system; they are clean and in good sanitary condition. No.

31. None occurred.

32. None occurred.

33. No typhoid fever has occurred since the 67th Regiment arrived at this station.

(Signed) W. F. STEVENSON,
Surgeon-Major, A.M.D.

22nd March 1878.

44. BELLARY.

a. Royal Artillery.

	Officers.	Men.	Women.	Children.
1. Strength	4	152	27	88
2. Admitted	6	203	32	96
Died		3	...	3
Invalided		5	1	...
Ratio per 1,000 strength per annum :—				
Admissions	1,500	1335·52	1185·12	1090·11
Deaths		19·74	...	79·53
Invalided		32·89	37·04	...

3. The barracks are situated on a plain about a mile from the fort; there are three blocks of buildings, each consisting of a room 74 feet long by 30 broad, capable of accommodating 35 men, and two small rooms at either end for non-commissioned officers. These blocks have each two verandahs, an outer open, an inner closed; the latter serves as a dining room. The buildings are of stone, with tiled roofs, the rooms ventilated by means of a ridge-roof and doors. The cook-houses are immediately behind these blocks; the cooking vessels are of copper, regularly tinned twice a month; the cooking arrangements according to the native plan.

4. Cubic space per man 2,028 feet, superficial 86·85 feet, not including verandahs. No deficiencies exist to affect the occurrence of typhoid fever.

5. Bedding, one palliasse, one pillow, one blanket, one carpet, and two sheets. The palliasse of canvas was stuffed with straw till June last, since then with coir. Nothing in their condition likely to cause or propagate typhoid fever.

6. Ventilation good, by means of doors and windows, also ridge openings. Nothing likely to conduce to typhoid fever.

7. Small iron urinals placed in front of each barrack block, emptied early in the morning into larger iron receptacles, and excreta conveyed to a distance of about two miles. No night closets are provided, the ordinary latrines being used if required. No injury seems to have

arisen from existing arrangements, and in no way to have affected the occurrence of typhoid fever.

8. There are two latrines attached to the Royal Artillery Barracks worked on the dry-earth system. The excreta are carried away twice within the 24 hours in covered iron receptacles; the urinals are attached to the ablution houses, and consist of iron cylindrical vessels containing charcoal, replenished monthly and tarred twice a week. There is nothing in their condition likely to induce typhoid fever.

9. There are two lavatories attached to the Royal Artillery Barracks; each is fitted with a centre bench of masonry, and at one side there are receptacles, also of masonry, for holding water. Each man has a basin made of iron tinned over. The water is obtained from a large well at the rear of the guard-room by the Royal Artillery, and from a well near the vicinity of the barracks by the Infantry. The refuse water is carried off by means of surface drains. There is a plunge-bath situated for the use of the Royal Artillery at the north end of the guard-room; the water is conveyed by means of pipes made of iron, a few inches of the surface water is allowed to run off per day and the bath is refilled. Nothing in connection with them to induce typhoid fever.

10. Scavenging is carried on by toties, sweepers and carts; the excreta are removed twice daily in air-tight iron receptacles. The refuse water from the ablution-houses is allowed to run off by means of surface drains. The troops are not exposed in any way to sewer gas in water or air. Nothing in my opinion has had any influence upon the occurrence of typhoid fever.

11. The flooring in barracks and all other buildings is of stone. The flooring of the hospital is asphalte. Nothing in their condition likely to induce typhoid fever.

12. Water in sufficient quantity is obtained from a large well situated midway between the hospital and Infantry barracks, and from another about 400 yards to the north-west of the Artillery barracks; there is no possibility of the water in these wells being polluted by organic matters. The filters in use consist of three earthen chatties placed one above the other in a stand made of bamboo; the upper contains charcoal, the second sand, and the third is the receiver. The sand is well washed before use and changed twice a month; the charcoal is renewed monthly. The filters work well, and there is nothing in connection with them likely to give rise to typhoid fever.

13. The married quarters consist of two long ranges of buildings capable of accommodating 25 families, and four blocks of detached buildings made of stone with out-houses complete. Surface drains exist in connection with them, which appear sufficient to carry off the water. The ventilation of all these buildings is satisfactory, and there is nothing in connection with them calculated to give rise to or propagate typhoid fever.

14. The reading and recreation rooms are quite suitable and adapted for the purposes intended. The lighting is sufficient, and there are no circumstances in connection with them likely to conduce to typhoid fever.

15. The canteen is a new building, with a superficial area of 660 feet and a cubical space of 11,880 feet; it is well ventilated and the accommodation sufficient.

16. The drinks in the canteen are rum, ale and porter, all of good quality. Burton Ashley's or Allsop's beer is also sold in the Royal Artillery canteen at 3 annas the pint. Cases of drunkenness are not unusually frequent in the battery, and only one case of delirium tremens has occurred. The liquors do not seem to have any baneful effect when taken in moderation, and have had no relation to the occurrence of typhoid fever.

17. The coffee-shops are situated near the canteens. The stores are of good quality and are much resorted to, and the hygienic result is satisfactory. Milk is not sold. Other articles of food are of good quality and not likely to conduce to enteric fever.

18. The workshop consists of collar-makers, wheelers and the forge; the two former have no prejudicial effect; the latter however, owing to the nature of the work, is likely to be harmful to those of delicate constitutions. There is nothing connected with it calculated to induce enteric fever.

19. The school accommodation is somewhat limited. Ventilation is sufficient. There is nothing in relation to it likely to conduce to typhoid fever.

20. The barracks are situated on an uncultivated plain on a slightly higher elevation than the rest of the cantonment. The horse-keepers' lines lie to the north-west of the barracks and are clean and well kept. The general sanitary supervision of the cantonment is satisfactory. There are no circumstances connected therewith likely to conduce to typhoid fever.

21. The men take great interest in gardening, notwithstanding the difficulty of obtaining water last year. There were six gardens in which English vegetables were grown, and to perfection, these were kept nice and clean. There was nothing connected with this calculated to induce enteric fever.

22. Cricket, American bowls and quoits are the usual outdoor recreation. These have a beneficial effect. The duties of the battery consist of exercise, riding, sword, and setting up

drills, guards and stables. Careful supervision is exercised that the men are not exposed to the sun. The average number of nights in bed has been for non-commissioned officers 4 and 5, gunners 4 and 5, and drivers 5 and 6. Nothing in connection with them likely to induce typhoid fever.

23. The quality of the rations has been fair. The bread had to be condemned on some occasions being imperfectly baked and containing grit. Vegetables are scarce. The means of cooking are by thse usual native method. The rations are roasted, baked or boiled at the discretion of the men. Nothing in either likely to induce typhoid fever.

24. The bazaars are situated at some considerable distance from barracks, and formerly, in consequence of the prevalence of cholera and small-pox, the troops were prohibited from entering these localities; but the prohibition has been removed. The usual country liquors are sold there, but as they are seldom resorted to, the prejudicial effect is slight. No cases of typhoid fever have been believed to have had their origin there.

25. Admissions for venereal are frequent, but the type of the disease is of a mild description, owing no doubt to the effective working of the Contagious Disease Act. No case of enteric fever has been traced to associations with prostitutes, &c.

26. The hospital is a large commodious double-storied building, situated north-west of the old fort. A portion of the ground-floor is allotted for the use of the Royal Artillery, the remainder being for the Infantry. The ventilation is sufficient, being carried out by numerous doors and windows. The average cubical space for each patient in the Royal Artillery Hospital has been 5,854 feet and the superficial area 244 feet. No cases of typhoid fever have originated in hospital.

27. There are five special case wards in connection with the hospital. Some of these have been used for the reception of cases of typhoid fever. These cases were removed on the slightest symptom indicating the disease.

28. The quarters of the Assistant Apothecaries are convenient to the hospital; the accommodation is very limited and the roofs leak during the rains. The Apothecary and Passed Hospital Apprentice have suitable accommodation. There are no quarters for the Hospital Assistant. Two ranges of buildings were lately erected adjacent to the hospital for the use of the servants, but they remain unoccupied. There is nothing connected with the sanitary condition of these buildings in reference to the occurrence of typhoid fever.

29. The bedding consists of a mattress stuffed with coir, sheets, blanket, counterpanes, pillows, and bed-side rugs. The clothing consists of flannel banians, cotton shirts, trousers (cotton and flannel), cotton gowns, socks worsted and cotton, and pocket handkerchiefs, all of good quality and suitable to climate. No case of typhoid fever has been propagated by means of either.

30. The latrines are sufficient and work on the dry-earth system, the working of which is satisfactory. The excreta are removed twice a day in air-tight iron receptacles. No case of typhoid fever is traceable to either.

31. Febrile affections and venereal diseases have caused most admissions. The first class consists of ague and simple continued fever; half the cases of ague seem to have been incurred when the battery was at Trichinopoly. The mortality during the past year has been low, only three deaths having occurred amongst the men.

32. As but one case of typhoid fever has occurred, I am unable to answer this query satisfactorily. The case in question could not be traced to any specific causes.

(Signed) B. HINDE, M.D.,
Surgeon-Major, A.M.D.

29th March 1878.

b. 43rd Light Infantry.

1. From 1st January to 31st December 1877:—

	Officers.	Men.	Women.	Children.
Strength	19	688	84	176
2. Admitted	27	1,057	174	196
Died	1	5	3	14
Invalided	...	20	2	...
Ratio per 1,000 strength per annum:—				
Admitted	1,372	1,532	2,071	1,113
Died	37	4	17	71
Invalided	...	20	11	...

3. The barracks consist of detached blocks placed in echelon, constructed of granite, and are well situated in an open space free from the proximity of other buildings. They face towards the prevailing winds. There was nothing connected with them which appeared to have an influence on typhoid fever.

4. The average cubic space per person was 2,837·35 feet and superficial area 147·66 feet. These measurements included only the actual apartments occupied by the troops, and the space was sufficient. These conditions had not apparently any effect on typhoid fever.

5. The bedding consisted of palliasses and pillows filled with straw, and was changed in accordance with regulations until the month of August, when coir was substituted. There was nothing in the condition of the bedding, as far as one can judge, which would be likely to cause or propagate typhoid fever.

6. The ventilation was provided for by large doors opposite each other, and by ventilators placed near the roof, and was sufficient. There was nothing in its condition which would be likely to conduce to typhoid fever.

7. The urinals and privies were the same as those in use during the day, and were sufficiently near to the barrack rooms to cause no inconvenience. No injury to health arose from this arrangement. The existing conditions have not had any apparent influence on typhoid fever.

8. The day privies are built of stone, and are fitted with sheet-iron pans coated with coal-tar. The contents of the pans were received in air-tight receptacles, emptied twice in 24 hours into the filth pits two and a half miles to the north of the barracks. The dry-earth system of conservancy was used, and the results were satisfactory. The urinals in use are attached to the lavatories, and are supplied with iron receptacles, which are emptied at the same time as the privy pans. No defects existed, and there was nothing in their condition likely to influence typhoid fever.

9. The lavatories are provided with tanks, which are filled with water obtained from wells in the vicinity of the barracks; each lavatory is supplied with eight half tubs, which were used for bathing; there is also a plunge-bath, which is supplied with water from a well adjoining. Each man was provided with a metal basin. The water after use was carried off by surface drains. There was nothing in connection with this subject likely to induce typhoid fever.

10. The surface sweepings were received in scavenging carts and removed twice daily to a distance of two miles from barracks. Surface drains are in use and were flushed daily, but they ought to be carried farther from the barracks. There was no sewage gas. The above conditions had no apparent influence upon the occurrence of typhoid fever.

11. The barracks and other buildings are floored throughout with stone, with the exception of the hospital wards, which are floored with asphalte. There was nothing in these conditions likely to induce typhoid fever.

12. The drinking-water is obtained from an Artesian well situated about 700 yards to the east of the barracks, and conveyed by a masonry channel to dip well in barracks, and is not liable to pollution. The ordinary three-chatty filters were in use. There was nothing in connection with the arrangements likely to give rise to typhoid fever.

13. The family quarters consist of six blocks, each containing 16 quarters, each quarter has in rear a small bath-room, cook-house and privy. Sufficient accommodation is provided for the married establishment. There was nothing in connection with them calculated to give rise to or propagate typhoid fever.

14. The reading and recreation room is suitable for the purpose, and there were no circumstances in connection with it which would have conduced to typhoid fever.

15. The canteen, which is under the same roof as the school, is well ventilated and suitable to the purpose. A new canteen is in course of erection, as it is considered that a separate building should be provided for this purpose. There were no circumstances in connection with it which are believed to be conducive to typhoid fever.

16. Commissariat arrack, ale and porter are the drink supplied. There does not appear to have been anything connected with these articles likely to induce typhoid fever.

17. A barrack-room was set apart for use as a regimental coffee-shop, to which the men resorted freely. Neither the milk nor the food sold have, as far as can be ascertained, conduced to typhoid fever.

18. There is a regimental workshop in existence, and it has had no influence prejudicial to the health of the men employed, nor was it calculated to induce enteric fever.

19. The school accommodation was sufficient, and there was nothing in relation to it likely to conduce to typhoid fever.

20. There are no buildings in the vicinity of the barracks; the general sanitary supervision of the station was satisfactory, and there was nothing connected therewith likely to conduce to typhoid fever.

21. The soldiers' gardens which existed were done away with during the year, the dryness of the climate and the scarcity of water rendering their cultivation impossible.

22. Cricket was the favorite game of the regiment, and was freely engaged in by the men; there was also a ball alley, which was in fair request; football and quoits were also occasionally used. The duties of the troops consisted of guards and picquets, and the men were not exposed to the sun. The average number of nights in bed was 7 and 8. There was nothing in connection with these matters likely to induce typhoid fever.

23. The quality of the rations during the year was good; they were cooked with the usual native appliances, and there was nothing connected with them likely to induce typhoid fever.

24. The neighbouring bazaar was closed to the men during the greater part of the year in consequence of the prevalence of cholera among the native population, and during the time that it was open to them it had no apparent ill-effect on their health.

25. The hospital is constructed of granite in two stories; the accommodation and ventilation was sufficient. The space per patient was cubic space 3,084·06 feet, superficial area 170·31 feet. No case of enteric fever originated in the hospital.

27. The special wards were suitable for the purpose, but were not used for cases of enteric fever.

28. The accommodation for the hospital staff and attendants was sufficient, and had no bearing on the occurrence of typhoid fever.

29. The bedding, clothing, and stores were suited to the purpose, and typhoid fever was not apparently propagated by their use.

30. The latrines were on the dry-earth system, and were emptied twice in 24 hours, the excreta being taken away in air-tight receptacles to a distance of about two miles, where it was emptied in trenches. Typhoid fever has not been traced to this source.

31. The prevailing diseases during the year were ague and venereal; ague was very prevalent during the latter part of the year, and is to be attributed to the unusually heavy rains at that period.

Two cases of enteric fever occurred during the year amongst the men, and one case amongst the women, viz.: men, 2 admitted, ratio per mille 2·95; women, 1 admitted, ratio per mille 11·90.

There is no record of the causes to which the above cases were attributed.

32. In the record of the cases there is no statement of the probable causes from which the disease arose.

(Signed) J. FLEMING, M.D.,
Surgeon-Major, A.M.D.

19th March 1878.

45. SECUNDERABAD.

Cavalry, Artillery and Infantry.

1. From 1st January to 31st December 1877:—

	Officers.	Men.	Women.	Children.
Strength	80	2,401	307	558
2. Admitted	91	2,896	319	490
Died	...	37	7	36
Invalided	4	83	...	...
Ratio per 1,000 strength per annum:—				
Admitted	1,137	1,206	1,039	878
Died	...	15	22	64
Invalided	50	34	...	...

3. Well built; stone or brick. Sites of Cavalry and Artillery very elevated; of Infantry not so high. "Entrenched post" too crowded. Number of latrines and subsidiary buildings excessive. Site of that for 2-16th Foot bounded on either side by low ground, which becomes swampy in the rains, and by tracts of land under rice cultivation. Conditions objectionable, but cannot assert their connection with typhoid fever.

4. The average cubic space in sleeping rooms, without verandahs, was 2,800 feet, superficial area 101·7 feet. No deficiencies exist. No connection with typhoid fever.

5. Iron cots. Coir bedding, ordinary covering. No connection with typhoid fever.

6. Doors, roof and windows. No connection with typhoid fever.

7. No night latrines. Urinals in or near verandahs. No connection with typhoid fever.

8. Wooden seats, iron vessels, "modified dry-earth system." No connection with typhoid fever.

9. Well devised and supplied. A basin for each man. Water runs off into receptacles regularly emptied. No connection with typhoid fever.

10. Sweepers collect refuse, which is at stated hours removed in specially constructed carts to "filth-pit." No connection with typhoid fever.

11. Of stone, No connection with typhoid fever.

12. From wells. Macnamara's filters. No connection with typhoid fever.

13. Sufficient. No connection with typhoid fever.

14. Suitable. No connection with typhoid fever.

15. Suitable. No connection with typhoid fever.

16. Good. No connection with typhoid fever.

17. Ordinary rooms frequented, results good. No connection with typhoid fever.

18. Healthful. No connection with typhoid fever.

19. Sufficient. No connection with typhoid fever.

20. Satisfactory. No connection with typhoid fever.

21. Yes. No connection with typhoid fever.

22. Usual games. No exposure. Duties light; nights in bed 5 and 4. No connection with typhoid fever.

23. Good. Vegetables scarce. Native method. No connection with typhoid fever.

24. The bazaars have no connection with typhoid fever.

25. Contagious Diseases Act in operation. No connection with typhoid fever.

26. Hospital admirable. No case originated in it.

27. Special wards suitable. Separation effected as a precautionary measure, the question of propagation by contagion being undecided.

28. Quarters for staff. None for servants. No connection with typhoid fever.

29. Iron cots. Coir bedding, ordinary covering. No connection with typhoid fever.

30. Wooden seats, iron vessels, "modified dry-earth system." No connection with typhoid fever.

31. Venereal disease, typhoid and other fevers, dysentery, hepatitis (33, with 9 deaths from "typhoid fever" during the period).

32. Dry-earth system on complete plan. Full supply of vegetables. Drainage of wet ground near site of 2nd European Infantry barracks. Reduction of number of latrines and subsidiary buildings in entrenchment. Effective night ventilation. All worthy of notice. To questions *a* and *b* can answer in the negative. To question *c* can only say that the subject is deserving of inquiry, but that I am not competent to decide it.

(Signed) T. O'LEARY,
Deputy Surgeon-General, A.M.D.

15*th March* 1878.

46. KAMPTEE.

Artillery and Infantry.

1. From 1st January to 31st December 1877 :—

	Officers.	Men.	Women.	Children.
Strength	23	830	134	188
2. Admitted	32	101	146	188
Died	...	5	4	13
Invalided	1	40	...	...
Ratio per 1,000 strength per annum :—				
Admitted	1,391	1,206	1,089	1,000
Died	...	6	29	69
Invalided	43	48	...	...

3. Sites low swampy ground to south and west, built of brick, those re-modelled require no improvement, the rest should undergo this process, being dark and insufficiently open to air and light. These conditions objectionable, but cannot assert their connection with typhoid fever.

4. The average cubic space in sleeping-rooms without verandahs was 2,849, superficial area 152 feet. No deficiencies exist. No connection with typhoid fever.

5. Iron cots, coir bedding, ordinary covering. No connection with typhoid fever.

6. By doors, roof and windows. No connection with typhoid fever.

7. No night latrines. Cannot speak as to urinals; day latrines and urinals close by; arrangements good. No connection with typhoid fever.

8. Wooden seats, iron vessels, "modified dry-earth system" in partial operation. No connection with typhoid fever.

9. Admirably devised; large metal basins fixed in masonry, supplied by taps; baths good, waste runs off into channels. No connection with typhoid fever.

10. Sweepers remove refuse in "Crowley's carts." No connection with typhoid fever.

11. Of stone. No connection with typhoid fever.

12. From protected wells and filtered before issue. Macnamara's filters not necessary. No connection with typhoid fever.

13. Those for Artillery well placed; for Infantry ill-situated; accommodation suitable. No connection with typhoid fever.

14. Suitable. No connection with typhoid fever.

15. Suitable. No connection with typhoid fever.

16. Good. No connection with typhoid fever.

17. Ordinary rooms, frequented, results good. No connection with typhoid fever.

18. Healthful. No connection with typhoid fever.

19. Sufficient. No connection with typhoid fever

20. Satisfactory. No connection with typhoid fever.

21. Yes, with Artillery chiefly results good. No connection with typhoid fever.

22. Usual games, no exposure, duties light, nights in bed 5 and 6. No connection with typhoid fever.

23. Good, vegetables scarce, native method. No connection with typhoid fever.

24. No connection with typhoid fever.

25. In Artillery Regimental Police supervision operative to some extent. No connection with typhoid fever.

26. Admirable; case did not originate in hospital.

27. Suitable; cannot say if the case was placed in detached ward, if so, the undecided state of opinion as to contagiousness of disease would very probably indicate isolation.

28. Quarters for staff; no provision for servants. No connection with typhoid fever.

29. Iron cots, coir bedding, ordinary covering. No connection with typhoid fever.

30. Wooden seats, iron vessels, "modified dry-earth system." No connection with typhoid fever.

31. Venereal disease, ague, dysentery, hepatitis, mortality low. One case of typhoid fever.

32. Dry-earth system in complete plan, full supply of vegetables. Drainage of swampy ground to south and west. Re-modelling of barrack blocks still unaltered. Effective night ventilation. All worthy of notice.

To questions *a* and *b* can answer in the negative. To question *c* can only say that the subject is deserving of inquiry, but that I am not competent to decide it.

(Signed) T. O'LEARY,
Deputy Surgeon-General, A.M.D.

15*th March* 1878.

47. CANNANORE.

Royal Artillery and Infantry.

1. From 16th December 1875 to 31st December 1877 :—

	Officers.	Men.	Women.	Children.
Strength	18	659	100	210
2. Admitted	21	1,258	123	124
Died	...	15	3	17
Invalided	5	42	4	12
Ratios per 1,000 per annum to average strength :—				
Admitted	1,166	1,910	1,230	590
Died	...	22	30	81
Invalided	277	63	40	57

3. Barracks single-storied, somewhat raised from the ground, fairly ventilated out-houses suitable and convenient, material of all brick and mortar.

4. Cubic space per man of 48th Regiment 2,035 feet, superficial 112 feet; of Royal Artillery 2,100 and 90: its conditions likely to influence typhoid fever.

5. Palliasses stuffed with straw quarterly, aired weekly.

6. Ventilation by doors, openings in walls and roof. No.

7. Night urinals provided.

8. On dry-earth system; suitable. Iron urinals filled with charcoal. Pans do not fit close to the seats. The Artillery are similarly provided.

9. In 48th lavatories too small; in other respects suitable. Each man is provided with an enamelled basin; water from wells in the vicinity, escapes by open masonry channels into drains, and so into the sea. Similarly with regard to the Artillery.

10. Refuse, &c., collected in pits and removed by carts, the liquids from cook-house by open drains, regularly swept.

11. Floors of barracks of wood, except those for families, they are of stone.

12. Water-supply is from wells not liable to organic pollution. The filters used are, in 48th Regiment the Macnamara, in the Artillery the old three-chatty. Nothing connected with the water-supply likely to cause typhoid.

13. Two rooms for family, with out-houses; suitable.

14. Recreation and reading rooms; suitable. No.

15. Suitable.

16. All supplies of good quality; nothing connected with them likely to conduce to typhoid fever.

17. A coffee-room, much resorted to. Supplies satisfactory.

18. Influence of workshops is satisfactory.

19. School accommodation satisfactory.

20. Soil is collected in closed receptacles and thus removed; it is buried at a distance from barracks. Conservancy of officers' compounds not satisfactory.

21. Soldiers' gardens are not much resorted to.

22. Cricket, quoits, hand-ball, &c. The men take walking exercise along the shore, and thus have sea-breeze. Duties not many. The men are permitted to be out of doors all day if they choose. Nights in bed for serjeants 4, corporals 5, drummers 11, privates 7; for the Artillery non-commissioned officers 5 and 6, gunners 12. Nothing in these likely to induce typhoid fever.

23. Rations good, considering local conditions.

24. Clean. Nothing to affect typhoid fever.

25. Association with prostitutes not caused typhoid fever.

26. Hospital accommodates in one ward 45 sick, with cubic space per patient 1,457 feet, superficial 103; in another 16, with a space each of 1,486 and 124 feet respectively. Ventilation fair.

27. Four special wards, all convenient and suitable.

28. Quarters only for two hospital subordinates.

29. Bedding and clothing satisfactory.

30. Latrines of hospital on dry-earth system, carefully attended to.

31. Continued fever, due to climate; also bowel affections and hepatitis. Mortality small.

32. No cases of typhoid fever reported in the 48th Regiment or portion of Royal Artillery at Cannanore.

(Signed) W. H. CORBETT,
Surgeon-Major, A.M.D.

NOTE.—The above particulars have been kindly furnished by Surgeon-Major Corbett. As, however, he had been only a few days at Cannanore, his information is necessarily defective. Surgeon-Major Holton was better acquainted with the conditions of the station, but he proceeded to England without furnishing me with a report such as the above, for which he had been called upon.

48. SAINT THOMAS' MOUNT.

Royal Artillery.

1. From 1st January to 31st December 1877:—

	Officers.	Men.	Women.	Children.
Strength	12	327	49	95
2. Admitted	14	482	55	50
Died	...	8	...	4
Invalided	1	4	...	...
Ratio per 1,000 strength per annum:—				
Admitted	1,083	1,474	1,122	526
Died	...	24	...	42
Invalided	83	12	...	...

3. North Barracks 1 long room, brick and mortar, terraced roof, at foot of Mount, facing east, not used.

South Barracks 1 long room, brick and mortar, terraced roof, at foot of Mount, facing east.

Horse Artillery Barracks 1 long narrow room, brick and mortar, tiled roof, facing north; one broad room, brick and mortar, bomb-proof roof, facing north. New Field Battery Barracks

three blocks, double-storied, brick and mortar, terraced roof, facing north and south. Neither site nor exposure has had influence on the occurrence of typhoid fever.

4. Space in sleeping-room, exclusive of verandahs, from 1,000 to 2,500 cubic space and 77 to 170 superficial. These conditions have not affected the occurrence of typhoid fever.

5. Iron cot, mattress and pillow stuffed with straw, one English blanket, two cotton sheets, one serge settringe. Nothing in their condition likely to cause or propagate typhoid fever.

6. Natural ventilation by numerous doors and windows. Nothing in its condition likely to conduce to typhoid fever.

7. In the new Field Battery barracks tubs are placed at night in the verandah of the upper stories. No injury perceptible, and cannot consider the conditions to have affected the occurrence of typhoid fever.

8. Day privies on the dry-earth system, day urinals the usual iron cylinders. Nothing in their condition likely to induce typhoid fever.

9. Each man has a basin; water for ablution purposes is kept in half casks in the bath and ablution rooms. Plunge-baths, water flows off from each by drains. Nothing in connection with this subject likely to induce typhoid fever.

10. Scavenging satisfactory. Drainage not quite satisfactory, covered drains being always liable to choke. Sewage unsatisfactory, the iron receptacles for excreta being emptied into carts instead of being removed. This condition is likely to have an influence on the occurrence of typhoid fever.

11. Principally flag stones, tile in some places; not likely to induce typhoid fever.

12. Wells of north and south barracks close to or in bazaar. Might possibly give rise to typhoid fever. Wells of Field Battery barracks free from danger. Macnamara filters supplied, not likely to give rise to typhoid fever.

13. Family quarters principally cottages; nothing connected with them likely to give rise or propagate typhoid fever.

14. No circumstance in connection with the reading or recreation rooms is believed to have conduced to typhoid fever.

15. No circumstance connected with the canteen and dependent buildings is believed to have conduced to typhoid fever.

16. No circumstance connected with the canteen drinks and supplies is believed to have conduced to typhoid fever.

17. No circumstances have occurred to induce a belief that milk or the articles sold in the coffee-room have conduced to enteric fever.

18. Nothing in connection with workshops calculated to induce enteric fever.

19. Nothing in relation to the school accommodation likely to conduce to typhoid fever.

20. The use of dwelling houses in the bazaar (close to north and south barracks) byres for 200 head of milch cattle is likely to conduce to typhoid fever.

21. Nothing connected with the gardens calculated to induce enteric fever.

22. Recreation principally cricket. The duties of Artillerymen do expose to the sun, especially at this station, where the buildings are scattered. Nights in bed never less than 5. Nothing in connection with these conditions likely to induce typhoid fever.

23. Nothing in rations or cooking likely to induce typhoid fever.

24. The bazaars are kept in very good order. The cattle byres (paragraph 20) are the only natural defect. No circumstances to cause belief that soldiers have contracted typhoid fever in the bazaar.

25. Enteric fever has not been traced to association with prostitutes or visiting brothels.

26. Hospital large isolated up-storey building, with a minimum of 1,600 cubic feet and 100 superficial feet for each patient. No case of enteric fever originated in hospital.

27. The only case of typhoid fever which occurred was only diagnosed after death. It was not isolated.

28. The nature of accommodation provided for the hospital staff has had no bearing on the occurrence of typhoid fever.

29. The bedding, clothing and stores have been suitable; typhoid fever not propagated by means of either.

30. Typhoid fever not traced to the state of latrines or of conservancy.

31. Statistics of typhoid fever during 1877—admitted 1 man, namely 3 men per 1,000 of strength; died 1 man, 3 men per 1,000 of strength.

32. The defects in the sewerage system. The only case appears to have resulted from climatorial causes and intemperance.

(Signed) E. NICHOLSON,
Surgeon-Major, A.M.D.

12th March 1878.

49. PALAVERAM.

Detachments.

1. From 1st January to 31st December 1877 :—

	Officers.	Men.	Woman.	Child.
Strength	1	41	1	1
2. Admitted	...	13	...	...
Died	...	...	...	...
Invalided	...	...	...	...
Ratio per 1,000 strength per annum :—				
Admitted	...	317	...	...
Died	...	...	...	...
Invalided	...	...	...	...

3. There are three barracks, they run from east to west, are situated on a sloping ground with an elevation of about three feet. Barracks are strong masonry buildings, are bomb-proof; each consists of one long room with verandahs on either side, which are shaded by trees; have no influence on the occurrence of enteric fever.

4. The average cubic feet per man was 1468·32, superficial space 105 square feet; measurement did not include verandahs. There are no deficiencies. This condition, as far as I am aware, would not influence the occurrence of enteric fever.

5. Iron cots with straw for bedding. None that I am aware of.

6. The barracks are ventilated by twenty windows and ten doors; nothing in this condition likely to conduce to enteric fever.

7. Urinals and night closets are provided; these conditions would not affect the occurrence of enteric fever.

8. The dry-earth system is used, the excreta being removed to a considerable distance in the jungle and buried. Nothing in this arrangement likely to induce enteric fever.

9. In No. 3 barrack special accommodation exists for ablution and bath purposes; in No. 2 barrack a small office, and in No. 4 a small room at the end of the barrack is allotted to these purposes. Tin basins are used; water obtained from well near; and after use is disposed of by surface drains. Nothing in these conditions likely to induce enteric fever.

10. The materials collected by scavenging and sewage are removed in carts every morning to a considerable distance in the jungle and buried. The natural drainage is good and is aided by surface drains. Troops are not in any way exposed to sewer gas, water or air.

11. Stone floors. Nothing in their condition likely to induce enteric fever.

12. Water-supply is obtained from wells, which from their situation are in no way liable to organic pollution. Nothing in these conditions likely to give rise to enteric fever.

13. None.

14. There are none.

15. A small room in a detached building is allotted as a canteen; it is very small and ill-suited to the purpose; however, as far as I am aware, there is nothing here that would be conducive to typhoid fever.

16. The drinks are good, and in moderate quantity conducive to the hygiene of the troops.

17. None.

18. None.

19. No school exists.

20. Conservancy good; the sanitary supervision of the station is well conducted; there occurred in one bungalow within the past year two cases of enteric fever, one of which terminated fatally; the source of the disease has not been traced.

21. None exist.

22. Cricket, foot-ball, &c., conducive to health. Troops were going through their annual musketry course, were not much exposed to the sun, were every night in bed. Nothing in these duties likely to induce enteric fever.

23. Rations were of good quality, large copper pots were used, and wood for fuel. Food is cooked by natives. Nothing here likely to induce typhoid fever.

24. Palaveram bazaar is in rather a bad state from a sanitary point of view, but it is distanced a mile from the barracks. There were no cases of enteric fever.

25. No venereal cases occurred.

26. The main ward of the hospital was screened off about its centre for the accommodation of the men; it has accommodation for six patients, is well ventilated, and situated about 700

yards from the barracks. Average monthly number of cubic feet per patient was 6,130, superficial space 225 square feet. No cases of enteric fever originated in hospital.

27. There are none.

28. No accommodation exists.

29. The regulation bedding and clothing were used and found suitable. Enteric fever was not propagated by any of these means.

30. The dry-earth system was used; conservancy good. Enteric fever not traced to either.

31. No disease prevalent.

32. No cases of enteric fever occurred.

(Signed) W. J. BOURKE,
Surgeon, A.M.D.

29th April 1878.

50. MALLIAPOORAM.

Detachment, 48th Regiment.

1. From 1st January to 31st December 1877 :—

	Officers.	Men.	Women.	Children.
Strength	3	83	5	10
2. Admitted		84	3	4
Died		1	...	..
Invalided		2	...	...

Ratio per 1,000 strength per annum :—

	Men.	Women.	Children.
Admitted	1,001	1,800	377
Died	11	...	...
Invalided	23	...	...

3. The barracks are built on the summit of an irregular-shaped hill which overlooks the river, and is about 200 feet higher than the bazaar and village of Malliapooram. The building faces east and west so as to catch the prevailing breezes. The situation appears to be very healthy, and the surface is well levelled and drained by surface drains.

Construction.—One long single room, built of laterite and plastered and whitewashed inside and out. The roof is formed of a bamboo frame-work thatched with cocoanut leaves and grass, and is yearly renewed ; the floor boarded and the verandahs laid down in asphalte. There are two small rooms at either end for Non-commissioned Officers. The building is cool and well suited to the climate.

The buildings connected with the barracks are built in the same manner, but are mostly tiled. They do not appear to have had any influence on the occurrence of enteric.

4. Cubic space per man as sleeping accommodation, 1911·57 cubic feet and 218 superficial, No deficiencies. The measurements given do not include verandah space.

5. Straw mattrasses, straw being supplied every quarter. Nothing likely to cause or propagate enteric.

6. Eave ventilation in all buildings and perfect ventilation between the tiles and through the thatch. Sufficient to keep the air pure. Nothing likely to conduce to enteric.

7. Night urinals, but no closets are provided; the latrine is within 50 yards of the barrack and has a covered way to it. Injury does not arise from existing arrangements, nor do they appear to have affected the occurrence of enteric.

8. Wooden and iron buckets, tarred regularly, and the contents removed twice daily and buried. The dry-earth system has been adopted latterly. Nothing in their condition seems likely to conduce to enteric.

9. There is one lavatory for the men, consisting of two rooms floored with asphalte. One is used for baths and the other for basins; each man is supplied with either an iron enamelled or block tin basin. Water is obtained from a well in centre of the barrack square, and is carried in the ordinary puckally's mussuck. After use it drains out of the building and into the river, which is about 250 feet immediately below. Nothing in connection with the lavatories appears likely to conduce to enteric.

10. By toties and sweepers. Received in iron buckets and deposited in trenches about 3 feet deep by 8 to 10 feet in length, with a covered roof consisting of cocoanut leaves, &c. Troops not exposed to sewer gas in water or air. Nothing likely in these conditions to cause enteric.

11. Interior of barracks, hospital, and some minor buildings boarded, verandahs of asphalte; bath-rooms, &c., of asphalte; married quarters of brick or laterite. Nothing in their conditions to cause enteric.

12. One well for drinking purposes and another for bathing, &c. Drinking-water of good quality and free of organic impurities. Three chatties on a tripod stand, with the usual sand and charcoal. Nothing likely to conduce to enteric.

13. Ample accommodation and free ventilation. Nothing likely to cause enteric.

14. Suited for the purpose required. Nothing likely to induce enteric.

15. Idem.

16. Of good quality, and not likely to induce disease of any description.

17. A small room at the end of barracks is given up for this purpose. The majority of the men frequent it. No overcrowding. Ample ventilation. Nothing likely to cause enteric.

18. No.

19. Ample. Nothing likely to cause enteric.

20. Sweepers and toties in sufficient numbers employed to carry out conservancy measures. Sanitary supervision exercised by Medical Officer in charge weekly, and daily in times of epidemics prevailing in the neighbourhood. Nothing likely to cause enteric.

21. No.

22. Out-door recreation, such as cricket, badminton, fives, swimming, &c., beneficial to health.

Duties.—Drills, parades, &c. Not exposed to the sun.

Number of nights in bed—non-commissioned 7, privates 18. Nothing likely to cause enteric.

23. Rations good; cooking carried out on the native system with earthen and copper vessels; the latter are tinned regularly twice a month. Nothing likely to cause enteric.

24. Only one small bazaar in the vicinity of barracks about 500 yards distant, which is kept clean; no effect upon the health of the men. Nothing likely to cause enteric.

25. Not carried out. Enteric fever not traced to association of soldiers with prostitutes.

26. Hospital constructed of the same material as barrack; contains a male and female ward accommodation for 12 men and 4 women. Ventilation sufficient. Cubic space per patient, 3,902 cubic feet and 321 superficial. Nothing likely to cause enteric.

27. No special wards.

28. None.

29. Coir mattresses. Flannel and cotton clothing in use; suitable and sufficient. Enteric fever not propagated by either one or other.

30. Latrines on dry-earth system; contents removed in iron or wooden buckets (tarred) and buried twice daily. Enteric fever not traced to either.

31. Simple continued fevers. One death from abscess of liver associated with dysentery. The Medical Officer in charge here at the time the case of enteric occurred appears to have been unable to determine the probable cause of the disease. The case appears to me to have been of the mildest description.

32. The case referred to in last paragraph is the only one on record that has occurred here within the last 25 years. (*a*)—Apparently not. (*b*)—Apparently not. (*c*)—Probably the result of climatorial influences.

(Signed) H. J. W. BARROW,
Surgeon, A.M.D.

16*th March* 1878.

51. RANGOON.

a. Royal Artillery.

1. From 1st January to 31st December 1877:—

	Officers.	Men.	Women.	Children.
Strength	8	133	20	38
2. Admitted	3	238	7	7
Died	...	4	...	...
Invalided	1	7	...	...
Ratio per 1,000 strength per annum:—				
Admitted	375	1,788	350	184
Died	...	30	...	...
Invalided	125	52	...	...

3. Two large barracks are occupied by the Royal Artillery. They are constructed entirely of teakwood and raised 11 feet above the ground; each consists of one long room with inner and outer verandahs. There are numerous doors and windows, which are kept constantly open. The buildings connected with the barracks are all constructed of wood with the exception of the regimental cells, which are of masonry. The barracks stand due west of the Great Pagoda, at a distance from it of about 400 yards. Their position is somewhat above the general level of the cantonment. They face north and south and so obtain the advantage of the prevailing wind blowing through them. No case of typhoid fever has occurred in them during the period under review.

4. Average cubic space per man, 2,704 cubic feet and superficial space 94·58. These measurements are exclusive of verandahs.

5. The bedsteads are of iron; the bedding consists of one paillasse and one pillow stuffed with straw, a pair of sheets, with one blanket and rug. Nothing in their condition likely to cause or propagate typhoid fever.

6. Ventilation by the numerous doors and windows, ridge ventilation. Nothing in its condition likely to cause typhoid fever.

7. Neither urinals nor closets for night use are provided. No injury seems to arise from this arrangement.

8. The day privies and urinals are built of wood; the urinals are provided with tarred iron pans, which are withdrawn by the sweepers and emptied into large iron receptacles, the contents of which are conveyed away by night and buried in an appointed place at the distance of one and half miles. No defects exist. Nothing in their condition likely to induce typhoid fever.

9. There is a lavatory to each barrack-room; that for the large building is situated underneath it, that for the smaller is a detached structure close to the barrack. The former is provided with a central stand of masonry on which the basins rest. No such accommodation is provided in the smaller structure. Each man has his own basin. Water is brought in by bheesties and kept in tubs placed in the lavatories. After use it flows into a cess-pool, whence it is drawn daily and conveyed to a distance to be spilled on the ground. The same arrangements exist for providing the baths with water and for disposing of it when used. Nothing in connection with these arrangements likely to induce typhoid fever.

12. Scavenging done by toties. No covered drains in lines. Sewerage of barracks and other buildings conveyed away by sweepers; disposed of by being buried at a distance. Large tarred iron "drums." The troops are not exposed in any way to sewerage in water or air.

11. Of wood. Nothing likely to induce typhoid fever.

12. Water-supply from wells in lines; not liable to organic pollution. The only kind of filter in use here is the sand and charcoal arrangement in three chatties. A superior description of filter ought to be provided.

13. There are no regular family quarters, old barracks being used for the purpose. The accommodation is ample, and there are the usual out-houses. All these are built of wood. Nothing connected with these quarters likely to give rise to or propagate typhoid fever.

14. These are suitable.

15. The canteen and subsidiary buildings are suitable, and there is nothing connected with them likely to conduce to typhoid fever.

16. These have been good, and taken in moderation would not injure the health of the troops. Cases of excess do, however, occur.

There is a coffee-room, where the usual coffee-room articles are sold. It was a good deal resorted to last year. No case of enteric fever has been traced to milk or any other article of food sold here.

18. There are no regular workshops.

19. There is ample school accommodation. Nothing likely to conduce to typhoid fever.

20. Vicinity of barracks healthy. The removal of night-soil in the station is conducted at night in covered carts under the supervision of the Cantonment Committee. General sanitary supervision of the station carried out effectually on the whole. Nothing likely to conduce to typhoid fever.

21. Only two small plots of ground, cultivated by a corresponding number of individuals.

22. Cricket, quoits, foot-ball, skittles; effect on health good. The usual cantonment duties of Garrison Artillery. Not much exposed to the sun on duty. Nights in bed—non-commissioned officers 7, gunners 6. Nothing in connection with these matters likely to conduce to typhoid fever.

23. Rations fair in quality. The usual cooking arrangements of India. Nothing in either likely to induce typhoid fever.

24. There are no bazaars in the immediate neighbourhood of the Royal Artillery lines; none nearer than half a mile off.

25. Sanitary effect of the Contagious Diseases Act beneficial. A good deal of illegal prostitution goes on, as the Royal Artillery lines are situated at a distance of nearly two miles from the locality occupied by the registered women.

26. The hospital is built of wood, and elevated above the ground in the same manner as the barracks. It consists of a single large ward with small detached rooms in the four angles, occupied as—(1) surgery, (2) receiving room, (3) hospital serjeant's room, and (4) unoccupied room, used occasionally as a special ward. The hospital is sufficient for the demands at present made on it. Ventilation carried on by open doors and windows, is excellent. Average cubic space per patient for 1877, 5,225 cubic and 640 superficial feet. No cases of enteric fever have originated here.

27. The small unoccupied room above alluded to is occasionally used as a special ward, to contain only a single patient. No special wards properly so called.

28. The accommodation of these officials has no bearing on the occurrence of typhoid fever.

29. These are all according to regulation, and are all well adapted to the end in view. Typhoid fever has not been propagated by their means.

30. The latrines and conservancy correspond closely with the same in barracks. No case of typhoid fever has been traced to these causes.

31. No disease prevailed except dysentery, of which there were a number of very serious cases with 3 deaths. The remaining death was due to hepatitis.

32. No case of typhoid fever has occurred in the Royal Artillery during the year.

(Signed) W. ROBERTSON,
Surgeon Major, A.M.D.

11*th May* 1878.

b. 89th Regiment.

1. From 21st December 1877 to 9th May 1878:—

	Officers.	Men.	Women.	Children.
Strength	16	593	62	149
2. Admitted	11	265	35	51
Died	...	2	...	4
Invalided	1	...	...	...

Ratio per 1,000 strength per annum:—

	Officers.	Men.	Women.	Children.
Admitted	68	446	55	342
Died	...	33	...	47
Invalided	11	...	...	...

3. The barracks are built on the most elevated portion of ground in Rangoon; they are constructed of wood, raised between 10 and 12 feet above the ground, built on piles of wood; each barrack consists of three large rooms, and at each end are quarters for non-commissioned officers, &c., these are the new barracks; but the old ones, some of them are in close proximity to the ground. The cells and workshops are built of brick. They have no influence on typhoid fever.

4. Average cubic space per man in old barracks 2,130, superficial feet per man 134. Average cubic space per man in new barracks 2,533, superficial feet 200. Band barrack cubic space per man 2,567, superficial feet 290; the measurements include the inner verandahs occupied by the troops. Not conducive to typhoid fever.

5. Iron cots, canvas mattrasses stuffed with straw quarterly, blankets and sheets. Nothing in them likely to propagate typhoid fever.

6. Roof, floor, doors and windows, &c. Nothing in its condition likely to cause typhoid fever.

7. Urinals are provided at some short distance from barracks; there are no night closets, the men go to the regular latrines about 20 or 30 yards from the barrack. No injury seems to arise from existing arrangements, and no cases of typhoid fever have occurred.

8. The day privies are of wood; metal pans are in use; no dry-earth system proper. The urinals are in little wooden houses, five metal pans in each house, one house to each barrack. Nothing in their condition likely to produce typhoid fever except the want of the dry-earth system in the latrines.

9. The lavatories in the new barracks are in the centre, and beneath the occupied flooring there is a raised plateau for basins, each man is supplied with a tin basin. Water is obtained from wells in barracks; it flows in well-made drains after use. The old barracks are supplied with wooden sheds, a boarded stand inside, on which the basins stand are in use; there is a small covered verandah leading from barracks to them; there are no baths in use. There is nothing in them likely to induce typhoid fever.

10. All satisfactory, removed morning and evening in air-tight iron cylindrical tubs, smeared inside and outside with tar, no exposure. Not conducive to typhoid fever.

11. The flooring of barracks consists of teakwood. Nothing conducive to typhoid fever.

12. The water is obtained from wells in the vicinity of barracks; three earthenware chatties on stands are used for filtering the water, charcoal and sand being placed in the uppermost one, sand in the second one, the water trickles through slowly and is received in the lower one. The water is not exposed to organic pollution and has not induced typhoid fever.

13. Each family has a separate room, the large families two rooms, their quarters are built of wood on piles raised from the ground. Nothing in connection with their structure likely to give rise to typhoid fever.

14. The reading and recreation rooms are well suited to health. Nothing in their position likely to cause typhoid fever.

15. The canteen is suited for the purpose it is intended. Nothing in connection with the building likely to originate in typhoid fever. The men procure coffee from the coffee shop; a good many men resort to this building in the early mornings. There is no article of food or milk sold in it that is likely to cause typhoid fever.

18. The workshops are conducive to the health of the men engaged. Nothing in them likely to cause typhoid fever.

19. The school accommodation is ample. Nothing in it likely to cause typhoid fever.

20. Carts go round daily to officers' bungalows and remove rubbish, &c., as in barracks; the general sanitary supervision of the station satisfactory. Nothing likely to cause typhoid fever.

21. Soldiers' gardens do not exist.

22. There is a gymnasium, conducive to health; parades take place half an hour before sunrise, last three-quarters of an hour; the evening parades half an hour before sun goes down, last half an hour; guards, fatigues, &c., not unnecessarily exposed to the sun; not allowed out of barracks between 9 A.M. and 5 P.M.; number of nights in bed—non-commissioned officers and men 7. Nothing in connection with their duties that is likely to cause typhoid fever.

23. Good, in the usual native style; copper-pots tinned twice monthly. Nothing in the cooking likely to induce typhoid fever.

24. No evil effects on health from the condition of bazaars. No typhoid fever has been contracted.

25. The Contagious Diseases Act is in force. No soldier contracted typhoid fever from associating with prostitutes.

26. The hospital is built of wood on wooden piles, consists of one large room with two small rooms at each end; there is no verandah; accommodation sufficient; ventilation by roof doors, windows and floors. The building is condemned. Average cubic space per man 2,048 feet, superficial aréa per man 133 feet. No case of typhoid fever originated in hospital.

27. None.

28. The Hospital Serjeant is accommodated in a separate building, consisting of two rooms built of wood; this building is condemned. The quarters allotted to the Medical Subordinates are quite unsuited, being so close to the ground. No case of typhoid fever has occurred in them; there are no quarters for hospital servants.

29. The bedding is suitable, consisting of ticken mattrasses filled with coir, English blankets, quilts and sheets. Nothing in connection with them likely to cause typhoid fever.

30. Typhoid fever has not been traced either to latrines or conservancy.

31. No particular prevailing diseases. The drainage in connection with the Infantry barracks at Rangoon is of such a nature that no cess-pools can remain for any length of time.

32. No reply.

(Signed) M. COGAN,
Surgeon-Major, A.M.D.

11*th May* 1878.

52. THAYETMYO.

Royal Artillery.

1. From 1st April 1877 to 31st March 1878.

2. Unfortunately the Medical Officer, instead of giving statistics as asked for, in respect to officers, soldiers, women and children, each class separately, has included the whole together, and thus rendered his figures useless for the purposes of this report.

3. The Royal Artillery barracks are situated on high ground and on the northern side of the cantonment; they consist of three blocks, two en echelon running north and south, facing

east and west, the other at right angles to the former two; they are 50 yards apart; in the interior space are the cook-house and latrine for the single men. The buildings are of teak, raised ten feet from the ground on posts of the same wood; the roofs are of shingle, and they also have a wooden ceiling; the rooms are lofty, well lighted and ventilated, the latter by ridge roof ventilation, also by venetianed doors and openings near the floor in the wainscotting. The buildings are thus divided into rooms: a large open space runs down the centre: in this are placed two rows of beds, at each side of this space is an inner verandah in which is a single row of beds; at each end of the building two sets of rooms (3 rooms in each set) for non-commissioned officers, a part of the ground floor under each building is boarded off so as to form bath-rooms and lavatories, from them the waste water is conveyed by a drain into covered cess-pits outside the building. The ground-floor is also used as a dining-room; there is also a skittle-alley under each of the single men's blocks.

The married quarters only differ in the division of the space; each quarter consists of two rooms, a back and front one, they communicate by a door and extend across the breadth of the building; they are surrounded by a verandah to accommodate 18 families. The single men's blocks are calculated to accommodate 80 men each, but one is only half occupied, the other half is partitioned off into coffee-shop and reading-room; the latter is also used as a theatre. The staff quarters, serjeants' mess and orderly-room are built of teakwood and raised from the ground like the barracks. The canteen, guard-room, and cells, also the various workshops and harness-rooms are of mason work and only raised from two to four feet from the ground. The guard-room has attached to it a latrine, urinal and bath-rooms. The guard-room, dry-room and cells (3) are well ventilated by swing windows and special openings.

4. Cubic space 2,164·44, superficial area 112·22 feet. The measurements include enclosed verandahs. No deficiencies exist.

5. Each adult is provided with an iron cot. The bedding consists of palliasses stuffed with straw changed every three months; one blanket (two in the cold weather), a pair of sheets and a pillow with cover, also a carpet. There is nothing in their condition likely to cause or propagate typhoid fever.

6. The means of ventilation are ridge-roof half-venetianed doors and special openings in the wainscotting near the floor.

7. None provided; the men use the usual day latrine and urinals. No injury arises. No typhoid fever.

8. The latrine is a teakwood building with an asphalte floor; the pans are iron vessels fitting close up to the seats and are easily removed; they are tarred. Dry-earth system only nominally carried out. The night-soil is removed in closed iron receptacles.

The urinals (2) are octagonal wooden buildings (teak), situated at a convenient distance; they are each divided in the centre, and four urine vessels, with an upper basin, are supplied to each; the flooring is asphalte; they are tarred when necessary. The urine is removed in closed iron vessels twice a day. There are no defects. Nothing likely to induce typhoid fever.

9. Each man has a zinc basin which he takes away with him; it is stowed away under his cot; four tubs or half casks are supplied to each barrack for baths, there is also one bath of mason work. Water is supplied from No. 3 well.

10. Open surface drainage exists; barrack refuse is placed in an iron receptacle until removed. The sewage of the lavatories and cook-house is received in covered cess-pits built of mason work, they are emptied twice daily. These cess-pits are the only places where men are likely to be exposed to noxious gases. No typhoid fever.

11. The flooring in barracks consists of wood; the guard-room, dry-room and cells chunam; latrines and urinals asphalte; lavatories and ground-floor of barracks are tiled. Nothing likely to induce typhoid fever.

12. Drinking-water is supplied from No. 1 well; it is well faced round with masonry so as to prevent surface pollution; it has no cover. All the well water in Thayetmyo is alkaline and has a great deal of salts in it. Not likely to give rise to typhoid fever. The three-chatty filters are in use.

13. The family quarters are similar in structure to the other buildings; they are sufficient. Nothing connected with them likely to give rise to or propagate typhoid fever, except cess-pits before mentioned.

14. The reading and recreation rooms are suitable. Nothing in connection therewith likely to conduce to typhoid fever.

15. Canteen is suitable.

16. The drinks and other supplies are good and not likely to produce disease, especially typhoid fever.

17. A coffee-room exists for the sale of ginger-beer, groceries, &c. Milk is not sold there. No typhoid fever.

18. Yes. They have a beneficial influence upon the health of the men employed in them.

19. There is no school; accommodation is provided in the European Infantry Lines in a building similar in every respect to one of the barracks.

20. Vicinity of the barracks or station healthy, except towards the north, the too close proximity of the cemetery and low lying ground towards north and south which is swampy during the rains. The night-soil and other refuse is removed in carts into the jungle and there disposed of either by fire or burial. General sanitary supervision of the station satisfactory. The water in the ornamental lakes south of the barracks is unfit for use; I think it would be likely to give rise to typhoid; it is not used for drinking, being dirty and sometimes having a bad smell.

21. No.

22. Cricket, fives court, skittles, these benefit the health; guards, parades, riding, and gun-drill fatigues. Not exposed much to the sun; nights in bed 5 and 6. There is nothing in connection with these likely to cause or propagate typhoid fever.

23. Generally good. Cooking is carried on by native hearths; copper vessels tinned twice a month, frying pans, &c. Native cooks are employed. Nothing likely to induce typhoid fever.

24. No cases of typhoid.

25. Do. do.

26. The sick of the Royal Artillery are accommodated in the station hospital (late Royal Artillery hospital), being now occupied by the sick of the Infantry, there would not be space enough in case of increased sickness, as in case of sore-eyes and other infectious diseases. No cases of typhoid fever originated in hospital.

27. There are none now.

28. Only a Hospital Serjeant and Passed Hospital Apprentice live in the building; there is not enough of accommodation for the combined attendants of Royal Artillery and Infantry.

29. Yes. No typhoid fever.

30. No typhoid fever.

31. Cholera prevailed in September and October 1877: admissions 14, deaths 10, also in December 1877 an admission, which recovered.

32. Nil. None.

(Signed) T. KINGSTON, M.D.,
Surgeon, A.M.D.

9th April 1878.

53. PORT BLAIR, ANDAMAN ISLANDS.

Detachment.

1. From 1st January to 31st December 1878 :—

	Officers.	Men.	Woman.	Children.
Strength	4	133	1	4
2. Admitted	...	85	...	...
Died	...	2	..	...
Invalided	...	...	...	...
Ratio per 1,000 strength per annum:—				
Admitted	...	681	...	...
Died	...	14	...	...
Invalided	...	...	...	...

3. The barracks are a large stone-building situated on an exposed ridge at the northern end of the island; the out-buildings are made of wood, and are situated at suitable distances from the barracks. Nothing in connection with these would influence the occurrence of typhoid fever.

4. Average space per man 3,027·90 cubic feet, superficial 120; this simply includes the actual apartments occupied by the men. Nothing in connection to influence the occurrence of typhoid fever.

5. Iron bedsteads, mattrass and pillows stuffed with straw, sheets, and one blanket. Nothing in their condition likely to cause or propagate typhoid fever.

6. The ventilation is good, both from the position of the building and the large numbers of doors and windows. Nothing in its condition likely to conduce to typhoid fever.

7. Night closets are not provided; the men have to go to the latrine, situated a short distance from the barracks; urinals are brought up to the barracks at night and removed the following morning. No injury arises from the nature of existing arrangements, nor would I consider them to affect the occurrence of typhoid fever.

8. The day privies and urinals are situated about 60 yards from and below the barracks; the dry-earth system is partially carried out; it is defective on account of sand being used and

not dry earth, from no shed existing in which dry earth can be stored; no receptacle in which the excreta, &c. could be stored before removal, and from the small number of toties employed. I do not think, however, there is anything in their condition likely to induce typhoid fever.

9. There are two lavatories. Metal basins are supplied, one to each man; there are also four tubs in each lavatory. The water is obtained from wells, and is disposed of after use by being emptied into open drains which run down into the sea. Nothing likely to induce typhoid fever.

10. The excreta are carried by hand and thrown into the sea; it is not temporarily received in any vessel. The drainage is good, partly natural from the elevated position of the barracks and partly by brick surface drains. There are no sewers. These conditions have no influence upon the occurrence of typhoid fever.

11. The flooring is in part stone and in part wood. Nothing in these conditions likely to induce typhoid fever.

12. The water is supplied from two wells situated on a slope on the eastern side of the island; these are not liable to organic pollution. The filters used in barracks are made from three chatties, containing charcoal and sand; they are sufficient. Nothing in connection with these likely to give rise to typhoid fever.

13. The Color Serjeant is the only married man in the detachment. He inhabits the upper storey of the barracks, which are amply sufficient. Nothing calculated to give rise to typhoid fever.

14. There are at present no reading or recreation rooms.

15. The canteen is situated within the barracks and is suitable.

16. Beer, porter and rum. They are good in quality, and have exerted no influence on the health of the troops or on typhoid fever.

17. There is one coffee-room within barracks; it is much resorted to, and has apparently exerted no influence on the health of the men or on typhoid fever, nor are there any articles sold there which would do so.

18. There are no workshops.

19. There is no school.

20. The barracks are isolated from all other buildings. The conservancy arrangements of the station are not satisfactory, the excreta, &c., being thrown on the sea-shore, where it often remains. General sanitary supervision of the station is ineffective. There are circumstances connected therewith, which might conduce to the occurrence of typhoid fever.

21. There are no soldiers' gardens.

22. Boating, fishing and shelling; these are not sufficient for the recreation of the men. Guards and parades; they are not much exposed to the sun. Non-commissioned officers four nights in bed, privates five. Nothing in connection with these matters likely to induce typhoid fever.

23. The rations are good. Copper vessels tinned twice a month. Nothing likely to induce typhoid fever.

24. The bazaar is in a fair sanitary condition, and does not appear to have any effect on the health of the troops or on typhoid fever.

25. There are no prostitutes or brothels in the station.

26. The hospital is a wooden building with excellent accommodation and ventilation. 5,538·37 cubic feet and 130 superficial per patient. No cases of enteric fever have originated in it.

27. There are no special wards.

28. The accommodation for hospital staff and attendants has had no bearing on the occurrence of typhoid fever.

29. The bedding is suitable, wooden cots, coir mattrasses and pillows, cotton quilts, sheets, and two blankets, as are also the linen and flannel clothing and stores. Typhoid fever was not apparently propagated by means of either.

30. Neither of the cases of typhoid fever which occurred here have been traced to either the latrines or conservancy.

31. During the period referred to at paragraph 1 there was no prevalent disease, nor was there any typhoid fever.

32. There is no reference made in the hospital records with regard to the etiology of either of the cases of typhoid fever which occurred here. In both cases the men had arrived in this station but a few days previously; it is, therefore, probable that in both cases they were exposed to influences in the stations from which they came, which were the causes of the disease.

There is no signature to this report.

4th April 1878.

SUMMARY AND CONCLUSION.

54. That the details contained in the sanitary reports now transmitted are tedious and marked by sameness I am quite aware, and if my remarks were only for purposes of reference in India, they would also be unnecessary; as, however, a chief object of my present report is to correct, if that be possible, views in regard to the prevalence of specific enteric fever in this country which appear to meet with unquestioned acceptance at home and among inexperienced medical officers in this country, I consider the dull repetition of details I have given as necessary, so that some idea may be formed of the actual conditions of our military stations in this command. It will be observed that only at a very small number of the places mentioned is an allusion made in regard to the existence of recognised causes of enteric fever, and that where such allusions occur, they are expressed in terms so problematical as to indicate the undecided views held by medical officers while writing about them. The following are the stations in regard to which such allusions occur. When an allusion by number is made to a report, the one alluded to is that of the station indicated, unless any further specification is made in the remarks, namely :—

Wellington.—The soldier named McDowell, and alluded to in paragraph 10 as having died in 1876 by typhoid fever, succumbed to heat-apoplexy, see No. 9 on the list of cases. A large number of the men who in 1877 suffered from what in the returns was designated typhoid fever, are said to have been exposed to the sun and to malaria. The case of Foice, 45th Regiment, alluded to in paragraph 26 and recorded as 18 in the list of cases, was one of febricula as stated in the first instance by Surgeon-Major Corbett; the attack subsequently assuming somewhat of a remittent type. Private Jeyes, alluded to in paragraph 31, his case No. 23 on the list, succumbed to adynamic endemic fever, non-specific. The medical officer considers that specific causes of typhoid fever are absent; that the cases of fever, such as they were, that did occur among the troops at the Depôt were due to endemic climatic influences.

Bangalore—*a. 14th Hussars.*—An ammoniacal odor from the urinals; the medical officer unable to say whether it induces " typhoid " or not. He objects to the system of water-supply from the Ulsoor tank, but makes no remark in regard to its influence or otherwise on " typhoid." Consequently, it is fair to assume, no such influence was observed by him to exist. He considers that " typhoid " has not originated from fæcal contamination of water or food; but that fevers observed were the result of endemic influences.

b. Royal Artillery.—The troops are not exposed to sewer gas in water or air. Water for drinking is obtained from wells and from the Ulsoor tank; the medical officer is unable to say how far the former is polluted; he does not record any source of such pollution; with regard to the latter, the water is very much contaminated, but in regard to its probable influence he writes uncertainly and indefinitely thus:—" If the occurrence of typhoid fever is to be traced to the use of water contaminated by organic matter, it is not unlikely that the water from the Ulsoor tank has something to say to it," a paragraph which really explains nothing. He notices the circumstance that during 1877 five cases of " typhoid " fever occurred, of which number four were fatal, but is unable to state anything definite in regard to the causation of attack in any of them. In the list of cases in the Artillery at this station, the cases enumerated are numbered 23 to 27 inclusive; in one of them the disease was heat-apoplexy; in a second ardent fever passing into heat-apoplexy; in two, adynamic endemic fever, non-specific; in one typho-malarial. The case that survived was one of the latter; the remaining four proved fatal.

c. 67th Regiment.—The medical officer states that " if typhoid excreta get into the Ulsoor tank such a state of things is likely to give rise to enteric"—a very conditional, but indefinite reply.

Bellary—*a. Royal Artillery.*—No circumstance connected with the barracks occupied by this part of the force has, according to the medical officer in charge, conduced to the occurrence of typhoid fever. Nor with regard to *b.* the Infantry.

SECUNDERABAD.—Of the nine deaths recorded as having taken place from typhoid fever in paragraph 31 of the preceding replies to queries, I am only able to trace the records of six in the history of cases at Secunderabad; of these, two deaths, namely, 12 and 13, occurred by ardent fever; two by that affection passing into heat-apoplexy, namely, 14 and 38; one, namely, 33, by endemic continued fever with enteritis; and one, namely, 37, by ardent fever passing into an adynamic or typhoid condition. None of the circumstances enumerated in the replies have had a relation to the supposed occurrence of typhoid fever.

KAMPTEE.—In the replies it is stated that *one* case of typhoid occurred during 1877; in the record of cases given to me it does not appear that any was reported during that year; hence, I assume a discrepancy exists between the two series of records presented. It does not appear that any of the conditions at this station included in the questions enumerated had an influence in the causation of the disease.

CANNANORE.—As already observed, information is not now available in a sufficiently precise manner in regard to the former conditions at this station to render a record of them valuable in relation to the origin of typhoid fever; suffice it to observe that conditions as they now exist at Cannanore are not considered to have any such relation. As remarked by the Surgeon of the 43rd Regiment in the observations quoted from his report at page 52 of the present document, during the time an epidemic of what was then believed to be typhoid fever prevailed among the soldiers of that corps, no case occurred in the married people connected with it, although their barracks were directly exposed to emanations from the privies which then existed, and were believed to exert a considerable influence in the causation of the outbreak.

ST. THOMAS' MOUNT.—The conditions described in paragraph 10 of the sanitary report on this station are considered by the medical officer *likely* to have an influence on the occurrence of typhoid fever. These are, covered drains liable to choke and unsatisfactory sewage; nothing of a definite nature can be gathered on this point, however, from the report as submitted by him. He considers that the water of certain wells "might possibly" give rise to typhoid fever; that the use of dwelling houses in the bazaar for the accommodation of cows might similarly conduce to the disease, although details are wanting in regard to the precise manner in which such a result was expected to occur. The only case recorded at this station under the heading of typhoid fever owed its origin, according to the medical officer, to climatorial causes. According to the record of cases two are included under this head in 1877, these are shewn to have been respectively ardent fever passing into heat-apoplexy, and continued fever, non-specific.

PALAVERAM.—According to paragraph 20 of the station report one case of enteric fever occurred at this place, no sufficient cause for the disease being traceable. According to the record of the case itself as given in the text, it was one of non-specific fever, continued in type. None of the conditions described were likely to conduce to enteric fever.

MALLIAPOORAM.—There is nothing in any of the conditions described in the sanitary report on this station that is likely to induce or propagate typoid fever. The case recorded as of typhoid at this station was in reality one of mild febricula.

BURMAH.

RANGOON—*a. Royal Artillery.*—No circumstance in connection with the conditions recorded, calculated to give rise to typhoid fever.

b. 89th Regiment.—In the replies to queries submitted to him, the medical officer omits altogether Nos. 16 and 17, namely, the points having reference to the condition of the coffee-shop and supplies and the recreation-room in regard to possible bearings upon the etiology of typhoid fever. Such omissions, doubtless, impair the value of reports received on the general question, yet it is natural to assume that had anything unfavorable in connection with these points presented itself to the medical officer he would have recorded it; and that the absence of such allusion, therefore, indicates the absence of apparent influence in this respect.

THAYETMYO—*Royal Artillery.*—The statistical details given by the medical officer are useless, for the reason noted by me under paragraphs 1 and 2 of his report, and unluckily time does not admit of his report being sent back for completion. So far as the information communicated is concerned, none of the circumstances related have had any relation to typhoid fever. No report received from the Infantry at Thayetmyo in time for publication.

None from *Tonghoo.*

ANDAMAN ISLANDS.

PORT BLAIR.—*Detachment.*—There are no circumstances recorded in connection with the conditions of the detachment of British troops employed at this penal settlement of a nature to originate or in other respects affect the occurrence of typhoid fever. Of the two cases recorded as of typhoid fever one is shown to have been of tertian ague, the other of adynamic fever, non-specific.

The general result of the foregoing reports is that, in no instance has it been possible to find the existence of local and specific conditions of a nature to originate or influence the occurrence of specific pythogenic typhoid or enteric fever among British soldiers or their families within the Madras command. The conclusion to my mind is self-evident that in the absence of specific causes of a specific disease, the specific disease itself does not and cannot exist. Once again, therefore, we are forced to conclude that the phenomena stated of late years to constitute specific pythogenic fever are none other than such as were known by old and experienced medical officers in India as pertaining to fevers of the country, endemic and climatorial.

C. A. GORDON,

OOTACAMUND, *June* 1878. *Surgeon-General, A.M.D.*

APPENDICES.

APPENDIX A.

The information given in the following pages has been obtained from Medical Officers holding charges, a "Form" of Return, together with the questions subjoined, having been transmitted to them for this purpose, namely:—

PARTICULARS OF CASES OF TYPHOID OR ENTERIC FEVER IN THE MADRAS COMMAND, SELECTED FROM A DATE AS FAR BACK AS PRACTICABLE.

NOMINAL LIST OF OFFICERS, MEN, WOMEN, AND CHILDREN AFFECTED AT PARTICULAR STATIONS.

NOTES.—In addition to the information solicited in the body of the Return, Medical Officers are requested to be so good as to furnish the following, as far as practicable, in Column 13. (In doing so the number referred to should be quoted and the required information inserted opposite it) *viz.*:—

1. Temperature Charts in as many cases of Enteric Fever as it may be in their power to collect.

2. In cases where the attack began in the form of Intermittent or Remittent Fever, a statement of the circumstances that lead to the case being diagnosed as one of *Enteric* Fever.

3. In all cases full particulars as to the occurrence or non-occurrence of eruption. In the instances in which an eruption was observed, a precise description of its character and extent.

4. The presence or absence of Diarrhœa and the character of the stools should also be noted.

5. Whether the patient had previously suffered from Ague, or other disease of a periodic character?

6. Or been in a district where local causes of so-called malarial disease prevailed. If so, for how long?

7. If the disease be attributed to contaminated food or drink, please give full details.

8. In cases of recovery from Enteric Fever, has the patient subsequently suffered from any form of periodic fever.

9. At the date of attack by Enteric Fever, did Ague or other malarial disease prevail in the locality?

10. In the accounts of *post-mortem* appearances, the condition of all organs to be noted, but precise information is specially requested in regard to the nature of lesions found in Peyer's patches, mesenteric glands, spleen, and large intestine.

WELLING

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
1. Cassen, 48th Regiment.	23	5	0	3	Sent from Bellary on account of delicate appearance.	1872. 9th June.	..	9th June.	1 day ..	Admitted suffering from an attack of ague. On 4th day after admission tongue became dry and brown; on 5th day intestinal hæmorrhage set in; passed a large quantity of blood and died almost immediately.
2. Green, 43rd Regiment.	21	2	0	4	Unhealthy strumous appearance; suffered from dyspepsia and considerable physical prostration, and was treated for acute Tuberculosis.	1873. 12th March	21st April.	..	41 days ..	On 10th day after admission fever of a continued form, pain in the ileum and tenderness with gurgling on pressure in the right side; on the 3rd day a dozen faint lenticular spots appeared on abdomen.
3. Gummery, 43rd Regiment.	18	0	0	4	Suffered from bronchitis and diarrhœa at Cannanore the month previous.	14th March	9th May.	..	57 days ..	Feverish, dissention of abdomen, gurgling and pain on pressure in iliac region, accompanied by constipation and tympanitis with very numerous taches bleuatres all over abdomen.
4. Westgate, Royal Artillery.	19	0	0	6	Health indifferent, suffering from immaturity and debility, also suffered from ague and purging prior to admission.	29th May.	26th July.	..	59 days ..	In hospital with simple venereal ulcer from 4th to 29th April; on 17th April he was feverish; seemed drooping and suffered from diarrhœa; motions of a "pea-soup" nature; and tenderness in the right iliac fossa with delirium at night and an eruption on abdomen and chest.
5. Robinson, 48th Regiment.	21	0	1	2	Suffered from Tænia solium and Orchitis.	6th June.	..	7th June.	2 days ..	On 31st May a febrile condition was noticed, the patient refused to partake of any food, cerebral and thoracic complications set in; sordes about the gums, inability to articulate, and he expired in a semi-comatose state on 7th June.
6. Heather, 107th Regiment.	21	4	0	7	The medical history sheet was blank.	15th June.	..	18th June.	4 days ..	Admitted with symptoms of simple fever to which was added a peculiar dark appearance of skin; on the morning of the 17th June was attacked with profuse epistaxis followed by extreme depression and involuntary motions from the bowels; sordes on the lips, tongue much coated, pain on pressure in region of the iliac fossa; became semi-conscious, pulse very weak and thready followed by troublesome sickness of the stomach; passed a dark colored motion in bed; at noon on the 18th pulse weaker, hands cold and clammy, seems to be sinking; passed a brown colored fluid, involuntary motion, became unconscious and expired at 8 P.M.

ION.

Particulars in regard to exposure or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
No history of any exposure or of having been subjected to any emanations of animal or vegetable origin.	No history of any traceable to infection.	About 3 feet from end of ileum there was a general congested state of the bowel which extended to within 6 inches of extremity where there were 2 extensive ulcerations of Peyer's patches in a gangrenous condition, and almost perforating the bowel; the whole of the large intestine was stained by blood, and the end of the gut full of fluid blood.	From the highly developed lesion found after death, the youth had probably been ailing sometime before reporting himself sick. 3. No record of eruption. 4. No record of diarrhœa. 6. Patient came from Bellary. 8. No record of ague prevailing.
No history of exposure; the disease appeared to be complicated with pneumonia and incipient phthisis.	May have been infection from cases at Cannanore, from which station he had come 14 days previous.	Recovered	Supposed to have contracted the disease at Cannanore. Bowels were irregular, at times loose and at other times costive. 4. No history of diarrhœa. 6. Came from Cannanore. 7. Did not suffer from ague.
No history of exposure ..	The same remark with reference to infection will apply to him as to Private Green's disease which was probably contracted at Cannanore.	Recovered	5. Had never suffered from ague. 6. From Cannanore. 7. Never.
Suffered from ague supposed to be due to malaria.	Supposed he may have contracted disease from Private Gummery as he was lying near him in hospital when the lad was suffering from simple venereal sore.	Recovered	7. Did not suffer here from ague after his recovery.
No history of exposure ..	Supposed to be infection, as several men were suffering from enteric fever in the hospital at the time, although all communication was strictly prohibited.	Mesenteric glands enlarged; spleen enlarged and congested, liver weighed 3 lb. 14 oz.; portal vessels filled with dark fluid blood; kidneys enlarged. *Intestines.*—Greater part of small intestine occupied by a tape worm, complete and perfect; Peyer's patches for 3 feet above the cœcum were indurated and ulcerated with brown sloughs still adherent.	3. No record of eruption. 4. No record of diarrhœa or constipation. 6. Came from Bellary.
No history of exposure; occupied a large upstair Barrack-room with nothing insanitary around it. Drinking water excellent, and he had not consumed any milk, which at that time was reported by the Police as having been procured from cows fed on stable manure.	No apparent cause of attack; no history of infection.	Spleen of a dark color resembling malarial coloring, weight 3½ oz. kidneys, both congested, right 4¾ oz.; left 5¼ oz.; supereneal capsules slightly enlarged. *Intestines.*—Peritoneal coat normal except that covering cœcum, the blood vessels of which were injected with blood giving the part a pink color; the mucous coat was slightly congested in numerous places, the lower portion of small gut presenting an unusual appearance from a pecular granular state of the lining membrane; Peyer's patches more prominent than usual from injection of blood, the follicles were not enlarged and no morbid deposit was observed. The solitary glands of both large and small intestines were perfectly normal, some scybalæ but no entozoa were found in the bowels.	The patient's comrade states that Private Heather was well up to the morning of the 14th, taking his meals as usual; on that day he could not eat his breakfast. 3. No record of eruption. 4. No record of diarrhœa. 5. Never suffered from ague. 6. Came from Secunderabad.

WELLING

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Dade of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
7. Watson, 43rd Regiment.	22	0	3	7	Anæmic-looking, suffered from simple continued fever at Cannanore, and sent here for debility.	1875. 13th June.	7th Aug.	..	56 days ..	Admitted for simple continued fever; the temperature on the 7th day of disease was 101 at 9 A.M., pulse 90; 8th day the temperature is now becoming persistent, 103 in the morning and 104 in the evening, and the case looked upon as a doubtful one; the patient is deaf; purged 6 times in 24 hours, yellow watery stools; 9th day, sordes beginning to appear on teeth and gums, no decided pain in abdomen; diarrhœa continued, stools "pea-soup" nature, tenderness on the right iliac fossa; countenance anxious; some delirium; on the 12th day a few suspicious spots on abdomen becoming more numerous from this date, and from this cause the case is diagnosed as enteric fever.
8. Ward, Royal Artillery.	24	0	3	0	Had evidently suffered from fever; for on arrival from Trichinopoly he was admitted to hospital with simple continued fever.	1876. 29th March	5th April.	..	7 days ..	On admission was suffering from pain in head, suffused eyes, high temperature and other signs of fever, no pain in abdomen; bowels confined; 2nd day pain continued severe in the head, and temperature high; bowels moved by medicine; 3rd day pain in the head and tendency to suppression of urine, pupils dilated; 12th day characteristic rose spots observed; 7th day had an exacerbation this evening and was delirious during the night; 23rd day temperature fell to 97·6, pulse 80, cerebral symptoms, marked signs of effusion; relieved by blisters.
9. McDowell, 1-21st Regiment.	23	3	5	1	Enjoyed good health and during 6 months previous to his last admission had been under treatment for primary syphilis and bubo.	23rd May.	..	26th May.	4 days ..	Was admitted with high fever, hurried breathing, suffused eyes, severe headache and pain all over the body; states he had been purged 3 or 4 times; on the 24th had bilious vomiting and profuse epistaxis; 26th, in a semi-conscious state, bowels not moved, tongue dry, sordes on the teeth and high temperature; at 9 P.M. had a convulsive seizure and died comatose; there was no eruption nor any symptoms to show the conditions due to typhoid.

TON—(*Continued*).

Particulars in regard to exposure or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
The reports state unable to attribute any local cause for the disease.	No history of the apparent cause of attack; he suffered from continued fever in Cannanore.	Recovered	5. No history of having suffered from ague. 6. Came from Cannanore.
There is every reason to suppose that this man brought the seeds of the disease from Trichinopoly.	Was not subject to any infection at this station.	Recovered	5 & 7. Never suffered from ague. 6. Came from Trichinopoly.
This lad had been two seasons at Wellington; there was nothing local insanitary in the Barracks to account for his disease; he was employed as a cook for one of the sections; was liable to alternations of temperature; he was in the habit of frequenting the bazaar where the Natives were suffering from fever and bowel-complaint, but I am unable to say positively that he was subject to any emanations of animal or vegetable origin.	Not aware of any; was not subject to infection as far as I know.	Spleen enlarged, soft and pulpy, weight 11 oz.; kidneys healthy, weight 6 oz. each. Intestines hyperæmic, condition of lining membrane of the stomach extending into the duodenum; walls of the duodenum atrophed in patches; in jejunum Peyer's and solitary glands tumefied and standing out as white patches on a red surface. In the ileum the glands both solitary and aggregate were ulcerated; typical typhoid ulcers elliptical in shape with raised margins and excavated surface; there was congestion of the surface in the lining membrane of the large intestine but no ulceration.	This man's condition was more of one suffering from sunstroke; the fever was of a remittent type; the *post-mortem* examination showed that he must have been suffering for some time from the disease, shown by the advanced lesions of the solitary and aggragate glands of Peyer's, although he did not complain and continued at his duty; he had not suffered from any malarial fever prior to this attack, nor had he been in any malarial locality, except Wellington may be looked upon as such. 3. No eruption. 5. Had not previously suffered from ague. 6. Came from Rangoon.

WELLING

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
10. Baxter, 33rd Regiment.	21	6	0	6	Had no entry on his Medical History Sheet prior to his admission; was a steady, temperate man, and spent most of his time in gardening.	1876. 29th May.	..	22nd June.	25 days.	Those of an ordinary attack of simple continued fever from exposure and malaria, with high temperature, headache and constipated bowels; during the course of the illness fever became remittent, blood poisoning showed itself by ulcerated throat; bowels became loose, evacuations brownish yellow with opaque whitish floculi floating through them resembling bran or caseine of milk; there were no lenticular spots on the body, and no gurgling in the right iliac fossa.
11. May, Royal Horse Artillery.	23	6	3	4	Health fair prior to attack. Suffered from secondary syphilis and hæmorrhoids.	23rd July.	..	1st Aug.	10 days.	On admission high fever, vomiting and purging; evacuations of a pale ochry color; was also deaf, heavy and listless; symptoms increased in severity; tongue became dry and brown, and characteristic typhoid eruption appeared over the body; on the morning of 1st August collapse set in; cold clammy sweat; severe abdominal pains; gradually became insensible and sank comatose from perforation of the intestine.
12. Banyard, 2-16th Regiment.	22	0	0	4	Suffered from sore throat and simple continued fever prior to the attack of enteric fever, and dysentery and febricula since the latter; thought to be due to a condition of malaria existing about the hills, and which caused febricula to be very prevalent this season.	9th Aug.	16th Sep.	..	39 days ..	Headache, shiverings and fever, bowels constipated, tongue foul. On the 7th day of the disease there were suspicious *blue patches* over the abdomen recognised as taches bleuâtres of Murchison; the bowels remained constipated, and there was no gurgling in the iliac fossa; the case was diagnosed as one of typhoid on account of the continued form of fever with eruption.
13. Day, 2-16th Regiment.	24	0	1	3	Suffered from simple continued fever and bronchitis prior to the attack of enteric fever.	1877. 3rd Feb.	14th March	..	40 days ..	Admitted to hospital complaining of headache, cold shivers, foul tongue and feverish; bowels constipated. On the 4th day of illness he still complained of headache, had a dull heavy dusky appearance and was stupid; bowels relaxed, offensive and ochry in color; no rose spots observable. On the 11th day the temperature rose in afternoon, tender, there was no gurgling or tenderness in the iliac fossa; the case was a mild one and ran a favorable course.

TON—(*Continued*).

Particulars in regard to exposure or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
There is little doubt that this man suffered from malarial poison from exposure in the soldiers' gardens.	Not aware of any; was not subject to infection.	Spleen much enlarged and congested, weight 1 lb.; kidneys healthy, each weighed 4 oz. *Intestines.*—The duodenum contained patches of congestion, the solitary and agminated glands of Peyer contained characteristic typhoid ulcers in numbers, the mesenteric lymphatic glands were enlarged and tumefied.	During his short residence in India had not been in any malarial district, or suffered from any form of ague previous to coming to Wellington. 2. Characteristic typhoid stools and rose eruption led to the case being diagnosed as one of enteric. 3. No eruption. 5. Not previously suffered from ague. 6. Came direct from England.
No history of exposure; had been for sometime serving in Secunderabad and may have there been subject to malarial poison. Am not aware of any admission for ague.	Not aware of any; was not subject to infection unless by visiting the Native bazaars.	Spleen enlarged, soft and pulpy, weighed 1 lb.; kidneys, right 3 oz., left 5 oz.; congested in patches in the medullary portion, otherwise healthy; blood vessels of the stomach congested; extreme vascularity of mucous membrane of duodenum and ileum with redness of texture. Peyer's patches consisted of a characteristic typhoid condition, the duodenum being swollen and prominent; ulcerated in the ileum with a typical ulcer at the ileo-cæcal valve through which perforation had occurred. Mesenteric glands were enlarged and swollen; large intestine congested, free from ulcers, solitary glands prominent.	5. Had not previously suffered from ague. 6. Came from Secunderabad.
No history of exposure as he had lately come to India with the 2-16th Regiment; not aware of his having suffered from ague.	Not subject to infection..	Recovered	5. Has not suffered from ague before or since. 6. Came from Secunderabad.
He suffered from paralysis on the voyage to India from exposure to the sun.	Not subject to any infection.	As this man has since died with pneumonia at the depôt, no traces of any lesions from the enteric fever were observed in the intestines.	5. Had not previously suffered from ague. 6. Came from Secunderabad.

WELLING

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.		1877.				
14. Doyle, 12th Lancers.	17 3	0 3	Has had no illness before the attack of enteric fever, but was a delicate, anæmic-looking boy.	11th May.	..	28th May.	18 days.	Weakness, headache, pain in the stomach, and fever, followed by diarrhœa and pain, and tenderness in the right iliac region; the stools were watery and yellowish, and occasionally tinged with blood; the characteristic rose spots were observed on the back and stomach; tongue became black; sordes formed on the teeth; active delirium set in followed by unconsciousness and death.
15. Rogers, 12th Lancers.	22 10	0 6	Has suffered constantly from diarrhœa prior to his present attack of enteric fever.	30th July.	..	9th Aug.	11 days.	Diarrhœa with fever; the stools were liquid and light in color, devoid of bile; fulness and tenderness over the abdomen including the hepatic region; in due course the symptoms all increased. The patient became very heavy, deaf and listless; tongue dry and brown. Four days before death lenticular rose spots were observed on the chest and abdomen; he sank suddenly in a state of syncope while making an effort to sit up in bed.
16. Huges, 43rd Regt.	21 0	0 8	Had never been in hospital.	2nd Aug.	..	..	..	High fever accompanied by severe headache which was thought to be febricula from exposure, it being prevalent at the time; but on the 5th day of the disease the temperature showed the case to be characteristic of typhoid. Diarrhœa has set in, stools of an ochry color and alkaline in reaction, containing the peculiar bran-like floculi; on the 11th day of the disease, pink lenticular spots appeared on the stomach and abdomen; became heavy and drowsy, picking the bed clothes in delirium, with severe pain and tenderness, fulness and gurgling over the abdomen.
17. Clarke, 12th Lancers.	35 10	0 7	Enjoyed good health prior to present illness; not in hospital since 1870.	6th Aug.	18th Sept.	..	44 days.	Admitted with symptoms of continued fever, but the stools rapidly becoming of an ochry color and liquid with tenderness and gurgling over the iliac region. Typhoid was diagnosed; there were no enteric spots, the case was a mild one and ran a favorable course.

TON—(*Continued*).

Particulars in regard to exposure or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
The case on admission was looked upon as febricula which was then prevalent from exposure.	No other cause; not subject to infection.	Spleen enlarged and congested, weight 1 lb. 2 oz.; kidneys healthy, each weighed 8 oz. *Intestines.*—Patches of congestion observed in the ileum; these had not advanced to suppuration; the lining membrane of the cœcum and adjoining colon presented highly congested patches of a purplish green color; tissues were softened and ulceration about to take place.	5. Not previously suffered from ague. 6. Came from Secunderabad. 8. Febricula prevailed at Wellington.
The disease was first thought to be febricula which was then prevalent at the station, from exposure, but on the appearance of the rose-colored spots was then diagnosed to be typhoid.	No other apparent cause of attack; not traceable to in fection.	The spleen was very large and flabby, almost diffluent, of a dark prune color; weight 1 lb. 13 oz.; kidneys both very large, pale in color, substance firm weighed 11 and 12 ozs. *Small Intestines.*—16 characteristic ulcers were found on the ileum and the adjoining cœcum; Peyer's patches were congested, tumefied, and ulcerated, the stages being well marked. Mesenteric glands enlarged; there was no perforation, although many of the ulcers approached near to it.	The case was an insidious one, the mildness of the symptoms not in the least indicating the grave condition of the disease. 5. Not previously suffered from ague. 6. Came from Secunderabad. 8. Febricula prevailed at Wellington.
There is no history of this lad having been exposed to malaria, having been but a short time at Bellary and only just from England.	No other apparent cause except febricula was prevalent; not traceable to infection.	Remains	Between the 25th of August and the 15th September this lad suffered from decided periodic attacks of ague, showing that the system must have been all along under some specific malarial poison; he was in the habit of walking into the valleys in the vicinity of Wellington, and no doubt there became exposed; he is still in hospital suffering from debility with one leg very much swollen and œdematus; no disease of the kidneys exists, and he has not lately had an attack of ague, but he is pale anæmic, as if still suffering from the effects of malarial poison; there is fulness over the spleen. 5. Had not previously suffered from ague. 6. Came from Bellary. 7. Suffered from periodic attacks of ague during his illness. 8. Febricula prevailed at Wellington.
There is no information of any exposure, but Private Clarke being a married man was in the habit of going to the Native bazaar for supplies on a market day once a week. There was nothing insanitary in or about his quarters, and the drinking water was good.	No other apparent cause of attack; not exposed to infection.	Recovered	This man was rather beyond the age for enteric fever, being 35; had never suffered from ague previously or since; was too short a time at Secunderabad to have contracted malarial poisoning; the disease was insidious and may have been due to some local atmospheric condition which gave rise to a great number of cases of febricula during the past season. 5 & 7. Had not previously or since suffered from ague. 6. Came from Secunderabad. 8. Febricula prevailed at Wellington.

WELLING

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1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.		1877.	1877.			
18. Foice, 45th Regiment.	38 0	11 11	His health may be looked upon as fair prior to the previous illness, having suffered from dysentery once in 1876.	14th Aug.	7th Oct.	..	55 days.	Admitted 16th July with a broken rib; on 30th July while in hospital was treated for febricula, 15 days, at which period diarrhœa set in, stools being yellow and liquid, alkaline in reaction, with gurgling in the iliac fossa, and rose-colored spots on the abdomen, chest, and back; the disease was diagnosed as typhoid.
19. Parrett, 48th Regiment.	23 8	3 0	Good prior to present attack.	14th Aug.	20th Sept.	..	38 days.	High temperature and headache, requiring purgative medicine, bowels being confined. On the 11th day of the disease passed a quantity of blood with gurgling in the iliac fossa, and characteristic typhoid spots when the disease was diagnosed as enteric.
20. Williams, 43rd Regiment.	20 5	0 6	Good health previous to present attack.	17th Aug.	28th Sept.	..	43 days.	Febricula with high temperature and headache, and was 17 days under treatment for this disease when it was changed to simple continued fever for which he was treated 25 days, and then changed to enteric in consequence of the continued characteristic typhoid temperature with tenderness over the right iliac region; the stools were ochry in color and rose-colored spots were observed on the stomach and chest.
21. Herlihy, 12th Lancers.	17 11	0 7	Good. In June 1877 was 39 days in hospital with sunstroke, due to exposure to sun.	3rd Sept.	..	..	..	Fever and headache, tenderness over the abdomen; stools of a clayey appearance; hepatic tenderness but no diarrhœa until the 19th September, when the stools became liquid and ochry in color and alkaline in reaction, accompanied by rose spots over the abdomen, and delirium, and after a long and serious attack of illness is now in a condition of great exhaustion and mental weakness, amounting almost to childishness, but should there be no relapse tho termination of his case will be satisfactory.

TON—(*Continued*).

Particulars in regard to exposure or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Came from Bangalore; had never suffered from ague either before or since the attack. I am unable to trace it to any exposure here.	Not aware of any, not traceable to infection; for, although the man was a patient in hospital when the disease was recognised and there were three cases of enteric under treatment, Private Rogers, 12th Lancers, Private Clarke, 12th Lancers, and Private Hughes, 43rd, these men were isolated in special wards and no communication could have existed between him and them.	Recovered	Febricula was prevalent at this station; thought to be from malaria (marsh poison) at the time of his attack, and from his having had a broken rib, result of an accident, he may have been exposed. His age is against enteric fever, being 38, and there was nothing insanitary in the Barrack he occupied or in the drinking water. 5 & 7. Had not before suffered from ague or since. 6. Came from Cannanore. 8. Febricula prevailed at Wellington.
Not aware of any exposure. Febricula was prevalent at the time.	No other apparent cause of attack; not traceable to any infection.	Recovered	The attack was mild, following febricula; the man had never suffered from ague either before or since; the hæmorrhage from the bowels at the time was inclined to be attributed to a slight condition of hæmorrhoids, and if there had not been gurgling and spots, would have been thought lightly of. 5. Suffered from febricula. 6. Came from Cannanore. 7. Has not since suffered from ague. 8. Febricula prevailed at Wellington.
This man was 42 days in hospital before his disease was recognised as enteric fever; and as there was nothing insanitary in the condition of the hospital itself, it can only be looked upon that the febricula and continued fever from which he suffered gradually developed itself into that of enteric.	Not traceable to infection.	Recovered	Had never suffered from ague; was only for a short time at Bellary before coming to these hills; was subject to the same conditions as the other young soldiers who suffered from febricula at this station which was thought to have been malarial poison. 5. Suffered from simple continued fever. 6. Came from Bellary. 7. Has not since suffered from ague. 8. Febricula prevailed at Wellington.
Not traceable to exposure except it be a peculiar condition here of fever being prevalent during the past season.	No other apparent cause of attack, not traceable to infection.	Recovered	5. Never previously suffered from ague. 6. Came from Secunderabad. 7. Has not since suffered from ague. 8. Febricula prevalent at Wellington.

WELLING

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
22. Evans, 43rd Regiment.	20 10	0 7	Good	1877. 14th Sept.	1877. 13th Oct.	..	30 days.	Febricula; severe headache, bowels regular. Seventh day of disease, enteric fever diagnosed in consequence of the stools being liquid yellow, and alkaline and rose lenticular spots on the stomach with characteristic temperature; the disease was a mild one and ran a favorable course.
23. Jeycs, 33rd Regiment.	23 7	1 11	Fair prior to present illness. Had an attack of febricula 10 days before present admission.	23rd Oct.	..	1877. 6th Nov.	15 days.	Fever of a continued type but not severe in form with constant headache without delirium, bowels constipated; no lenticular spots; 3 days prior to his death he was seized with severe pain of an inflammatory nature over the centre of abdomen, passed a large quantity of blood from the bowels accompanied by cold clammy sweats and signs of perforation. When these symptoms showed themselves the disease was diagnosed as enteric fever.
24. Mrs. Granados	25 0	5 0	Fair health previous to present attack.	1876. 25th Aug.	1876. 28th Sep.	..	35 days.	High fever, pain in the head and back attributed to exposure when at market; the fever was of a continued type, bowels regular at first, but on the 6th day diarrhœa set in, gurgling in right iliac fossa and severe pain in the abdomen; the patient became stupid and listless and characteristic rose-colored spots became apparent, disappeared and recurred on the abdomen, chest and back, tongue became black, and there was active delirium. On the appearance of the stools and rose spots, the case was diagnosed as enteric.
25. (Boy). Monaghan, 89th Regiment.	14 0	7 0	Good	23rd June	22nd July	..	30 days.	High fever, enlarged tonsils, headache, pain in the bones and joints. On the 4th day after admission dry tongue, pain in right iliac fossa, rose-colored lenticular spots, characteristic typhoid, liquid stools followed by delirium and listlessness. Disease ran a favorable course.
26. (Girl). McCarthy, 89th Regiment.	15 0	7 0	Good	10th June.	21st July.	..	42 days.	High fever, pains in the head and limbs, abdomen distended, bowels constipated followed by rapid exhaustion. Diarrhœa set in on the 9th day, rose lenticular spots appeared on the abdomen and breast, face became flushed and was heavy, listless and delirious. Case ran a favorable course; made a good recovery.

TON—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Febricula was prevalent; may have been exposed to some poison as he was in the habit of knocking about the hills.	Not traceable to infection.	Recovered	5. Never previously suffered from ague. 6. Came from Bellary. 7. Had not since suffered from ague. 8. Febricula was prevalent at Wellington.
Suffered from febricula ..	Ditto	Extensive peritonitis, effusion of pus and recent thick lymph over whole surface of intestines which were matted together. Spleen pale externally, weighed 11 oz.; kidneys, capsules adherent, substance friable and congested. *Small Intestines.*—At the lower part of the ileum, about 12 inches from the valve, there was an irregular ragged raised ulcer in the centre of which there was a perforation; 4 inches lower down another ulcer not perforating, and 2 smaller near the ileo-cæcal valve, Large intestines healthy.	3. No history of eruption. 5. Not previously suffered from ague. 6. Came from Kamptee. 8. Febricula prevalent at Wellington.
Traceable to exposure, but the symptoms were more that of sunstroke than malarial poison.	No other cause; not due to infection.	Recovered	5. Had not previously suffered from ague. 6. Came from Cannanore. 7. Has not since suffered from ague.
Traceable to exposure, as he had been to the bazaar the previous day.	No other apparent cause; not traceable to infection.	Recovered	5. Had not previously suffered from ague. 6. Came from Madras. 7. Has not since suffered from ague.
Not traceable to exposure ..	Not traceable to infection.	Recovered	5. Had not previously suffered from ague. 6. Came from Madras. 7. Has not since suffered from ague.

BANGA

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
1. Brown, 14th Hussars.	29 5	0 11	Good	1877. 1st Jan.	..	1877. 9th Jan.	12 days ..	Hot skin, thirst, white furred tongue, headache, quickened full pulse.
2. Young, 14th Hussars.	22 0	1 1	Good	5th Feb.	1877. 26th Mar.	..	52 days..	Hot skin, tongue dry, furred, diarrhœa, pulse quick and not too full. Headache, lassitude, and slight pain in iliac fossa.
3. Weatherly, 14th Hussars.	26 5	1 8	Not good. Had been in hospital for 41 days with fever and had been out one month. He had apparently quite regained his strength and weight.	18th Oct.	..	24th Oct.	7 days ..	Hot skin, dry tongue, increased pulse; no diarrhœa; thirst, headache and flushed face.

Cases Treated in

4. Mrs. Giles, 14th Hussars,	22 11	1 5	Delicate ..	17th July.	..	18th July.	Probably 10	High fever, sordes on lips and tongue; delirious; marked prostration; tense and painful abdomen; frequent stools of a "pea-soup" character; pulmonary congestion. Rose-colored spots over entire trunk. Delirium.
5. Thomas Riordan, Royal Artillery.	10 1	Born in India; half caste.	Good	19th July.	2nd Sept.	..	55 days ..	High fever, great prostration, abdominal tenderness, frequent stools of a "pea-soup" character. Subsequent to admission delirium, gurgling over ileum, congestion of lungs, rose-colored eruption over abdomen on 17th day.
6. Mary Riordan, Royal Artillery.	7 11	Born in India; half caste.	Good	22nd July.	2nd Sept.	..	55 days ..	High fever, prostration, abdominal tenderness, bowel flux of a "pea-soup" character. Subsequent to admission slight rose rash over abdomen; on 14th day tympanitic distension of intestines, bronchial congestion and lung engorgement, liver congestion.

LORE.

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
No evidence	No evidence	Spleen soft, congested, and enlarged; weight $15\frac{1}{2}$ oz. Liver little enlarged, spots of congestion in lower part of ilium; lower down, distinct inflammation of solitary and Peyer's patches; ulceration in various stages, more advanced in cæcum and upper part large intestine. Mesenteric glands all enlarged. Coats of intestines generally attenuated; no perforation.	3. None. 4. Slight. 5. 6. } No.
No evidence	No evidence	....	3. Rosy lenticular spots on abdomen first appeared evening of 3rd day. 4. Slight. 5. 6. 7. } No.
No evidence	Possibly the sequel of the former attack.	Slightly increased amount of fluid in ventricles and brain. Extensive ulceration of Peyer's patches and solitary glands in small intestines; a large ragged deep ulcer in large intestine of old standing just below ileo-cæcal valve; spleen enlarged, congested, and easily broken down. Liver congested; no abscess; mesenteric glands all enlarged.	Probably the large ulcer in large intestines was the result of the former disease; but must have been either partially healed or quiescent for some time. 3. None. 4. No diarrhœa, stools watery, clay-colored; contained a good deal of fæcal matter. 5 6. 8. } No.
Female Hospital.			
Nothing definite on this heading.	No	A *post-mortem* much objected to by husband and friends.	Sporadic cases of the disease were present in the Artillery Barracks in the vicinity. 5. 6. 8. } No.
Nothing of a definite character..	No	......	Brother of the following case. 5. 6. 7. 8. } No.
Nothing of a definite character..	No	......	There is no doubt that this and the preceding case had been exposed at the same time to the influence, whatever it might be, generating the enteric fever. A case had occurred in the married quarters of the 14th Hussars, also in the Artillery Barracks, but there did not appear any connection between them. 5. 6. 7. 8. } No.

BANGALORE

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
7. Mary O'Shea, 45th Regiment.	Y. M. 10 0	Y. M. Since birth at Poona, 10 years	Slight continued fever; general debility; child rapidly growing and delicate.	1877. 11th Aug.	1877. 9th Sep.	..	43 days..	Severe fever of a continued type; marked prostration; bowel flux of a "pea-soup" character; great tenderness over ileum. Subsequently delirium; congestion of base of right lung; abdominal distension; marked stupor, all but amounting to insensibility; congestion of bronchi and structure of both lungs; intermittent pulse; great pain over caput cæcum.
8. Mrs. Mallen, 14th Hussars.	23 10	1 7	Had ague as a child. Two attacks of continued fever, one following sun exposure and a month before suffering from enteric fever.	26th Aug.	16th Oct.	..	56 days..	Severe febrile disturbance; pain and abdominal distension very frequent; bowel flux of a "pea-soup" character; prostration. Subsequently in course of disease delirium and stupor; slight rose-colored eruption over abdomen on the fifth day; intense injection of conjunctiva and duskiness of skin generally; gurgling in right iliac fossa; bleeding from nose and lips; renewal of rose eruption on the seventh day; general bronchitis, terminating in great anæmia and debility.
9. Caroline Lambert, 14th Hussars.	5 11	1 7	Good, but had the usual illness of children, measles and hooping-cough.	15th Sept.	16th Oct.	..	34 days..	High febrile disturbance; prostration; bowel flux with typhoid stools; abdominal tenderness and gurgling over caput cæcum; subsequently delirium with conjunctival injection; diarrhœa very persistent.
10. Wendling, Royal Horse Artillery.	20 0	0 3	Good	1873. 15th May.	1873. 24th June.	..	41 days..	Slight febrile disturbance and general malaise.
11. Bazlett, Royal Artillery.	21 0	0 6	Indifferent; had been 17 days in hospital with dyspepsia, and the disease developed itself.	22nd Aug.	15th Oct.	..	55 days..	Came on insidiously with dry skin, flush face, quick pulse, and daily increasing pyrexia.
12. Kingsley, Royal Artillery.	23 0	0 6	Indifferent; had been 15 days with enlarged glands, when the disease developed itself.	24th Aug.	19th Nov.	..	86 days..	Commenced with pain in abdomen, diarrhœa, and febrile disturbance.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Nothing obtainable under this heading.	None	....	This child was received from the 45th married quarters and was the only case. The most careful examination of the mother failed to produce anything tangible on the point of causation. 5. No. 6. Had been in Tonghoo two years before coming to Bangalore four years ago. 7. } 8. } No.
Nothing tangible	None	....	Replies to Notes. 5. As a child; not since. 6. Not since a child. 7. } 8. } No.
Not to be traced	None	....	Taken ill in school, but there is no apparent connection between this fact and the cause of disease. 5. } 6. } 7. } 8. } No.
Lived in Ulsoor Barracks close to the Ulsoor Bazaar.	None	Recovered	2. No. 3. Rose-colored spots, few in number, elevated and disappearing on pressure, appeared on abdomen and back. 5. } 6. } 7. } 8. } No.
Previous to admission lived in the Ulsoor Barracks, otherwise not exposed to emanations.	None	Recovered	2. No. 3. A few spots of the above characters appeared on abdomen. 5. } 6. } No. 7. Had an attack of ague in 1876, three years subsequently. 8. No.
Previous to admission lived in the Ulsoor Barracks, otherwise not exposed to emanations.	None	Recovered	2. No. 3. Crops of characteristic spots appeared on abdomen and back. 5. } 6. } No. 7. Has left for England. Before departure did not suffer from ague. 8. No.

BANGALORE

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.		1873.	1873.			
13. Wood, Royal Artillery.	22 0	0 6	Good	24th Aug.	15th Nov.	..	84 days..	Appeared to be a mild case of simple continued fever.
14. Frost, Royal Artillery.	21 0	0 6	Good	10th Sept.	23rd Dec.	..	93 days..	Slight febrile disturbance and general malaise.
15. Wildish, Royal Artillery.	24 0	0 7	Good	24th Sept.	22nd Dec.	..	91 days..	High ardent fever, uncomplicated.
16. White, Royal Artillery.	19 0	0 7	Attacked while in hospital convalescent from dysentery.	16th Sept.	22nd Dec.	..	100 days.	Came on insidiously with daily increasing pyrexia.
				1874.	1874.			
17. Miles, Royal Artillery.	24 0	1 2	Good	28th April.	24th June.	..	58 days..	Appeared to be a mild case of simple continued fever.
18. Peile, Royal Artillery.	21 0	1 2	Good	28th April.	2nd Aug.	..	97 days..	High, ardent, uncomplicated fever.
19. Gunn, Royal Artillery.	28 0	1 2	Good	9th May.	24th June.	..	47 days..	Appeared to be in about the eighth day of the disease, as all the symptoms of enteric fever were present when he reported sick.
20. Smith, Royal Artillery.	21 0	1 4	Good	28th June.	15th Sept.	..	81 days..	General pyrexia and malaise.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Lived in Ulsoor Barracks close to the Ulsoor Bazaar.	None	Recovered	2. No. 3. Copious and characteristic. 5. 6. 7. 8. } No.
Ditto ..	None	Recovered	2. No. 3. A few characteristic spots on back and abdomen. 5. 6. } No. 7. Has left for England. Before departure did not suffer from ague. 8. No.
Ditto ..	None	Recovered	2. No. 3. Spots characteristic and well marked. 5. 6. } No. 7. Has left for England. Before departure did not suffer from ague. 8. No.
Not exposed to emanations from Ulsoor Bazaar as he had been in hospital for some months previous to the attack.	None	Recovered	2. No. 3. Numerous crops of well marked and characteristic spots. 5. 6. 7. 8. } No.
Lived in Ulsoor Barracks close to Ulsoor.	None	Recovered	2. No. 3. Eruption not well marked as the body was covered with sudamina. 5. 6. 7. 8. } No.
Ditto ..	None	Recovered	2. No. 3. Spots characteristic but few in number appeared on abdomen. 5. 6. 7. 8. } No.
Ditto ..	None	Recovered	2. No. 3. Spots characteristic but few in number appeared on trunk. 5. 6. } No. 7. Has left for England. Before departure did not suffer from ague. 8. No.
Ditto ..	None	Recovered	2. No. 3. Spots characteristic and numerous on abdomen. 5. 6 7. 8. } No.

BANGALORE

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
21. Cox, Royal Artillery.	25 0	1 5	Good	1874. 21st July.	1874. 30th Sept.	..	72 days..	General pyrexia and malaise.
22. Wheeler, Royal Artillery.	30 0	1 6	Good	17th Sept.	3rd Nov.	..	48 days..	Appeared to be a mild case of simple continued fever.
23. Watson, Royal Artillery.	24 0	0 2	Good	1877. 13th June.	..	1877. 14th June.	2 days ..	Great nervous depression and high temperature.
24. Digby, Royal Artillery.	33 0	4 4	Indifferent; stated that he suffered from ague before admission.	29th June.	..	12th July.	15 days..	Much depressed and apparently suffering from ague of an irregular type.
25. Hannah, Royal Artillery.	22 0	3 3	Good.	1874. 15th April.	1874. 18th May.	..	33 days..	Usual symptoms of simple continued fever.
26. Howell, Royal Artillery.	22 0	1 2	Good	1877. 29th May.	..	1877. 12th June	15 days..	General febrile symptoms.
27. Hitchen, Royal Artillery.	33 0	3 7	Good	31st July.	..	6th Aug.	7 days ..	Usual symptoms of simple continued fever.
28. Payne, 45th Regiment.	21 0	A few weeks.	A poor puny Recruit.	1875. 25th April.	1875. 12th May.	..	30 days..	High fever; tongue dry, red and cracked; bowels moved four times; 2 or 3 spots on abdomen.
29. Lynch, 45th Regiment.	28 0	6 0	In hospital three times previous for general debility.	30th May.	13th July.	..	45 days ..	Severe form of continued fever; tongue furred and dry; skin hot; pulse quick; bowels constipated; no spots. Rose spots detected on 3rd June; gurgling in right iliac fossa.
30. Mrs. Kearny, 45th Regiment.	24 0	(?)	(?)	1876. 21st Aug.	..	1876. 30th Aug.	17 days..	Fever; prostration; purging, vomiting.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Lived in Ulsoor Barracks close to Ulsoor Bazaar.	None	Recovered	2. No. 3. Eruption well marked and characteristic on chest and abdomen. 5. 6. 7. 8. } No.
Ditto ..	None	Recovered	2. No. 3. No eruption. 5. 6. } No. 7. Had an attack of ague in 1877, three years subsequently. 8. No.
Ditto ..	None	Peyer's patches much swollen and elevated, and at some points ulcerated; mesenteric glands much enlarged; spleen soft and friable, weight 8 ounces.	2. 3. 5. 6. } No. 7. Died. 8. No.
Ditto ..	None	Peyer's patches ulcerated in neighbourhood of cæcum; mesenteric glands enlarged; spleen soft and friable, weight 10 ounces.	2. The range of temperature and the appearance of rose-colored spots and alkaline diarrhœa led to enteric fever being diagnosed. 3. Well marked eruption on abdomen and back. 5. Stated that he suffered from ague before admission. 6. No. 7. Died. 8. No.
Not exposed	None	Recovered	2. No. 3. Copious rose-colored eruption on abdomen and chest. 5. Suffered from ague. 6. Yes, at Kamptee for three years. 7. No. 8. No.
Ditto ..	None	Peyer's patches ulcerated; mesenteric glands normal; spleen congested, weight 10 ounces.	2. No. 3. No eruption. 5. No. 6. No. 7. Died. 8. No.
Ditto ..	None	Peyer's patches much swollen, congested, and some points ulcerated; mesenteric glands enlarged; spleen enlarged, soft and friable, weight 9 ounces.	2. No. 3. No eruption. 5. Suffered from ague. 6. Yes, at Kamptee. 7. Died. 8. No.
None given	None given	....	....
....	....	....	....
(?)	(?)	No *post-mortem*	Many of the details required are wanting in this case; there is now no possibility of obtaining them.

BANGALORE

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
31. Mullen, 21st Regiment.	22	0	2	2	Good	1871. 9th June.	..	1871. 13th July.	35 days..	General debility; cold sweating; loose bowels; after twenty days blood in stools; coma; no rash.
32. Smith, 21st Regiment.	20	0	2	3	Indifferent; discharged four days previously after six days of ague.	8th July.	..	8th July.	29 days ..	Debility; foul, tremulous tongue; low remittent symptoms; bowel tenderness after seven days. No rash.
33. Steward, 21st Regiment.	33	0	2	10	Good	1872. 27th Jan.	1872. 12th March	..	45 days ..	Malaise and fever; dry skin and tongue; iliac tenderness; no diarrhœa; rose spots plentiful on abdomen (afterwards livid spots).
34. Mills, 21st Regiment.	20	0	2	1	Nine days syphilis and pyrexia preceding diagnosis.	5th Mar.	..	1872. 14th Mar.	10 days ..	High temperature, degree not stated; "typhoid" symptoms; diarrhœa; ileum painful; tympanitis; rose spots sparsely dispersed on abdomen.
35. Cook, 21st Regiment.	22	0	3	1	Weak frame ..	18th Mar.	..	3rd April.	17 days ..	Greatly depressed; pinched face; tongue furred; constipation; "suspicious spots over abdomen."

BEL

1. Wilks, 43rd Regiment.	24	0	3	9	Hepatitis three months previous to admission.	1876. 22nd July	1876. 14th Sept.	..	56 days..	Pyrexia without any abdominal symptoms at first.
2. Fagan, 43rd Regiment.	27	0	4	4	Delicate ..	1877. 18th Feb.	1877. 15th April	..	57 days..	Pyrexia without at first any abdominal symptoms.
3. Walsh, 43rd Regiment.	32	0	4	4	Healthy ..	1st March	23rd April.	..	54 days ..	Pyrexia without abdominal symptoms; constipation.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the etiology of the disease in individual Cases.
10	11	12	13
Not stated	Not stated	Liver congested, 4 lb. 4 oz.; spleen indurated, 1 lb. 4 oz. (chiefly grumous blood); mesenteric glands enlarged and indurated; lower ileum and cap. cæci blackened (? blood), many gouged-out ulcers in both, some cicatrizing reaching to peritoneal coat; cheesy and bilious matters filled the ulcers.	Was at Kurrachi for two years in 1869-70, whilst much malarious fever existed there. He is entered on admission to hospital as enteric fever, 9th June (but over an erasure). On 7th July he was re-entered now as remittent fever; finally he died as enteric; was pronounced convalescent ten days after admission, relapsed ten days later. No history of ague, but was treated with 10-grain doses of quinine and stimulants from the start.
Not stated	Low health, probably from recent fever and ague.	Liver enlarged and indurated, 4 lb. 8 oz.; spleen enlarged and indurated, 2 lbs. 7 oz.; kidneys fleshy and tough; small intestines with many gouged-out ulcers, two of them perforating; large intestines with similar ulcers, none perforating, tending to heal.	Exposed to malaria at Kurrachi for two years in 1869-70. This was his second admission during the year, the first being ague.
Not stated	Not stated	...	Was at Kurrachi with the regiment; no history of ague; but he was treated with 10-grain doses of quinine from the start.
Not stated	Not stated..	Spleen congested (no weight given); ileum much congested and ulcerated, especially near ileo-cæcal valve.	At Kurrachi with the regiment. No admission in books for ague, but he took 225 grains of quinine for the typhoid fever in ten days; the venereal sore healed during the attack.
Not stated	Probably from a deficient water-supply.	Liver fatty; small intestines and Peyer's patches ulcerated; caput cæcum ulcerated; spleen not mentioned	Had been in Kurrachi in 1869. Disease diagnosed enteric from the start. Diarrhœa developed on seventh day; spots fully developed on eighth day, extent not given; temperature 100° on fifth day, 103°, 104° and 106° on eighth day; for next six days the entry is (Idem); this seems impossible. Died on 3rd April (seventeenth day); temperature given as 103°, 104°, 103°; no ague during past year.

LARY.

....	Latrine conservancy at Bellary excellent, and suggests no probable explanation of the disease.	....	3. None. 4. bowels relaxed, motions at first clay-colored deepening into diarrhœa.
....	Ditto.	....	3. Lenticular spots on twelfth day. 4. Evacuations yellow ochre-colored.
....	Ditto.	....	3. Doubtful. 4. Constipation; diarrhœa.

BELLARY

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
4. Grimson, Royal Artillery.	Y. 24 M. 11	Y. 2 M. 4	Very good ..	Admitted 9th June 1877; on the 12th symptoms of enteric fever became evident.	..	1877. 20th June	8 days ..	Flushed face; eyes suffused; tongue loaded; appeared deaf and confused; bowels relaxed. On the third day temperature rose to 103°; became delirious; sordes appeared on teeth.

SECUN

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1. Smith, Royal Artillery.	21 8	8 6	Good ,, ..	1876. 22nd Oct.	..	1876. 8th Nov.	18 days..	Febrile symptoms came on gradually while in hospital, accompanied with cough and diarrhœa.
2. Mills, Royal Artillery.	24 0	0 9	Good ,, ..	1st Nov.	1876. 28th Dec.	,,	41 days..	Febrile symptoms with severe headache; high temperature; diarrhœa; ailing previously for some days.
3. Barnett, Royal Artillery.	21 0	0 1½	Good	12th Dec.	1877. 30th Jan.	,,	36 days..	Febrile symptoms; high temperature; deafness; diarrhœa, but not excessive; had been ailing for a fortnight previously.
4. Arbor, Royal Artillery.	26 5	6 0	Good; had little sickness, and none for two years previous to admission.	1877. 27th Feb.	27th April.	,,	21 days..	Strong fever; very high temperature, 106°, and appearance approaching sunstroke.
5. McCartney, Royal Artillery.	22 0	3 6	Good	2nd June.	18th Aug.	,,	32 days..	Usual febrile symptoms; bowels constipated.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
No	None	Liver large, weight 4½ lbs; spleen highly congested and friable, weight 1 lb; upper two-thirds of ileum covered with congestive patches; ulceration of Peyer's glands; ulcers in different degrees of development, no perforation; ascending and transverse colon congested in entire extent; the solitary glands implicated.	2. Case diagnosed as enteric fever when diarrhœa and gurgling in right iliac fossa set in. 3. None. 4. Diarrhœa present; motions very dark. 5. No. 6. No; joined direct from England. 8. There were a few cases, but chiefly in men who had contracted it elsewhere.

DERABAD.

None traceable	None apparent	Typical lesion in ileum; Peyer's glands ulcerated; lungs congested; spleen enlarged, weight 14 ounces.	3. Rose-colored eruption on abdomen and chest on fifteenth day. 4. Diarrhœa, stools pea-soup like and copious. 5., 6., 7., 8. No.
None traceable	None	....	3. No eruption. 4. Diarrhœa; stools light yellow pea-soup like; hæmorrhage from bowels. 5. Never had ague. 6. Never resided where prevalent. 7. Had not ague after recovery. 8. No ague disease in the station.
None traceable	No	....	3. During fourth week eruption of rose-colored spots on abdomen, chest and back. 4. Diarrhœa, stools light yellow and characteristic. 5., 6., 7., 8. No.
Had been ailing for some days before; out shooting day before admission. No exposure as above traceable.	None apparent	....	Attack probably hastened by exposure to sun day before admission. 3. Rose-colored spots on neck and chest end of the first week, not numerous. 4. Copious pea-soup like stools. 5., 6., 7., 8. No.
None traceable	None apparent	....	3. Rose-colored lenticular spots on thirteenth day on abdomen, not numerous. 4. Diarrhœa of pea-soup like stools in second week. 5., 6., 7., 8. No. Stated that about a fortnight before admission partook of water at a village when out walking.

SECUNDERABAD

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.		1877.	1877.			
6. Bevan, Royal Artillery.	26	6	4	6	Not good; had been out of health for some months previously.	7th July.	28th Aug.	..	27 days..	Febrile symptoms came on gradually while on sick list from ulcer on the instep, resulting from a mosquito bite. Intense headache and want of sleep from beginning.
7. Catchpool, Royal Artillery.	22	0	0	4	Good	24th July.	22nd Sept.	..	27 days..	Febrile symptoms, with slight cough and tendency to diarrhœa.
8. Coley, Royal Artillery.	26	0	4	4	Delicate; had not suffered from any sickness to speak of during previous 12 months.	31st July.	30th Sept.	..	22 days..	Symptoms of febricula; high temperature; shortly after severe headache; diarrhœa excessive and stools of light yellow color.
9. Rose, Royal Artillery.	27	0	5	5	Good, with exception of six days with febricula in preceding month to admission; had had no sickness for upwards of a year.	4th Aug.	14th Sept.	..	21 days..	Febrile symptoms; tongue clean; bowels loose.
10. Newton, Royal Artillery.	21	0	0	5	Good; diarrhœa for three days early in month preceding admission.	27th July.	5th Oct.	..	39 days..	Ordinary symptoms of febricula; pulse fair; tongue clean; fever; after assumed intermittent type.
11. Fox, Royal Artillery.	20	11	0	5	Good	8th Aug.	..	..	39 days..	Febrile symptoms with severe headache; constipated bowels; white and furred tongue; been ailing for two days previously.

—(*Continued*).

Particulars in regard to Exposure, in otherwise to Emanations of Animal or Vegetable Origin.	Any other appearent cause of Attack ? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Had been on leave to Trichinopoly, whence he returned on 18th June and on 24th idem was put on sick list with ulcer.	None apparent	....	3. A few rose-colored spots apparent on eighth day on abdomen. 4. Diarrhœa with usual light yellow-colored stools in third week only. 5. 6. 7. 8. } No. Did not drink any water at Railway stations while travelling.
None traceable	None apparent	....	3. Rose-colored eruptions well marked on sixteenth day. 4. Diarrhœa early in case; at first stools clay-colored, after usual light yellow colored. 5. 6. 7. 8. } No.
No ; none traceable	No	....	3. Copious eruption of rose-colored spots on tenth day. 4. Diarrhœa excessive for a time, stools usual pea-soup like character. 5. 6. 7. 8. } No. Considerable congestion of lungs in this case.
None traceable	None apparent	....	3. Well marked eruption of rose-colored spots commenced on seventh day. 4. Diarrhœa, stools at first dark, bilious, after yellow ochrous color. 5. Had ague in 1873 and 1874. 6. From beginning of 1872 to early in 1876 between Deesa, Ahmednuggur and Baroda. 7. Had no ague after recovery. 8. No fever prevalent in this station.
None traceable	None apparent	....	2. Continued high temperature in third week. Iliac tenderness; deafness; drowsiness; tongue much furred and coated. 3. Eruption of rose-colored spots from eighteenth day very copious and persistent for ten days. 4. Diarrhœa, yellow characteristic stools. 5. No, never. 6. 7. } No. 8. No; ague never originates in this station.
None traceable	None apparent	....	3. Rose-colored spots visible on sixteenth day. 4. Diarrhœa of characteristic nature. 5. 6. 7. 8. } No. A severe case ; lungs much congested and abdominal affection marked and prolonged.

SECUNDERABAD

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
12. Walter, Royal Artillery.	24	0	4	5	Healthy; no sickness in previous six months.	1877. 30th July.	..	1877. 26th Aug.	27 days ..	Usual symptoms of febricula of ardent nature; tongue clean; pulse fair; bowels not affected.
13. Girl Oliver, Royal Artillery.	13	9	4	6	Healthy ..	6th Aug.	..	26th Aug.	20 days ..	Severe febrile symptoms of an ardent nature, without any definite type; bowels constipated.
14. Girl Loose, Royal Artillery.	8	5	1	6	Delicate, spare child, often ailing.	18th Aug.	..	23rd Sept.	37 days ..	Febrile symptoms with diarrhœa and abdominal tenderness; tongue much coated.
15. Feeling, 2-16th Regiment.	22	0	0	3	Previous health good; was in hospital for three days in March 1876 with enlarged sub-maxillary glands.	1876. 1st May	..	1876. 4th May	4 days ..	Slight febrile symptoms; furred tongue and flushed face; diarrhœa for a few hours on the day after admission; no pain in abdomen; no tympanitis over abdomen.
6. Gladwell, 2-16th Regiment.	19	0	0	5	Delicate ..	17th July.	1876. 8th Dec.	..	53 days ..	High temperature; coated tongue; headache; bowels inclined to be loose; no abdominal pain nor any gurgling in iliac region.
7. Fry, 2-16th Regiment.	22	0	0	5	Delicate ..	25th July.	23rd Oct.	..	90 days ..	Admitted with dry, hot, skin; quick pulse; temperature 100° to 102°; tongue coated, somewhat dry and glazed; bowels constipated.
18. Button, 2-16th Regiment.	22	0	0	6	Good	29th July.	..	1876. 5th Aug.	7 days ..	Prostration; diarrhœa; high temperature, ranging from 101·6 to 103; tongue dry and somewhat brown; compressible pulse; pain in iliac fossa; tympanitis and considerable purging.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack; infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
None traceable	Had deserted about a month before and was brought back from Cocanada; suffered severe hardships and exposure, but no infection traceable.	Typical affections of Peyer's glands; perforation of intestine, 16 oz. fluid in cavity of peritoneum; spleen enlarged; other viscera healthy. Intestinal tract congested throughout.	Admitted to hospital 22 days after return. 2. Fever had a daily remission during first and part of second week; on nineteenth day temperature 105°; very restless; abdominal pain; diarrhœa of light yellow stools set in together with 3. Eruption of rose-colored spots; enteric unmistakably developed. 4. Bowels not affected early in disease, but after stools of usual light yellow color. 5. 6. 7. 8. } No.
None traceable	None apparent	No *post-mortem*	2. There was a partial daily remission in the first week, but on thirteenth day iliac tenderness was observed with 3. Eruption of rose-colored spots on fourteenth day, and 4. Diarrhœa of usual yellow-colored motions. 5. 6. 7. 8. } No.
None traceable. Lived in a separate quarter in Heavy Battery Lines, but not far from a small and objectionable native bazaar.	None apparent	No *post-mortem* examination ..	3. Rose-colored eruption on ninth day. 4. Diarrhœa, stools yellow colored; bowels often irregular; hæmorrhage from bowels in fourth week. 5. 6. 7. 8. } No.
No	None	Enlargement of Peyer's patches in ileum, a few of which were highly inflamed and inclined to ulcerate; solitary glands enlarged; spleen normal.	2. Treated for simple continued fever; typhoid character not diagnosed during life. 3. None. 4. Slight stools, yellow. 5. 6. 7. 8. } No.
No	None	Nil	3. Rose-colored spots on abdomen. 4. At first dark, then pale yellow. 5. 6. 7. 8. } No.
No	None	Nil	3. None. 4. Pale, devoid of bile. 5. 6. 7. 8. } No.
No	None	Congestion of mucous membrane in jejunum and ileum; enlargement of agminated glands; some commencing ulceration; several near ileo-cæcal valve and over the intestines to about 18 inches above valve. The ulcers reached their greatest magnitude near the ileo-cæcal valve, and one had penetrated down to muscular coat.	3. None. 4. Dark, offensive; contained blood. 5. 6. 7. 8. } No.

SECUNDERABAD

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
19. Williams, 2-16th Regiment.	19 0	0 6	Good	1876. 1st Aug.	1876. 8th Sept.	..	39 days..	High temperature, over 102; purging without tenderness or tympanitis; delirium, dry brown tongue, quick pulse, great debility.
20. Todd, 2-16th Regiment.	37 0	0 6	Good	10th Aug.	26th Oct.	..	77 days ..	Fever; weak, stupid and drowsy. Temperature 103·8; tongue foul, pulse 84.
21. Evans, 2-16th Regiment.	25 0	0 6	Very good ..	11th Aug.	..	1876. 15th Aug.	5 days ..	Fever with high temperature 102; purging and debility almost from the commencement; skin hot and dry, pulse feeble.
22. Clifford, 2-16th Regiment.	20 0	0 6	Good	21st Aug.	27th Oct.	..	67 days..	Frontal headache, flushed face, high temperature, pulse full; no diarrhœa; no eruption.
23. Hazleton, 2-16th Regiment.	37 0	0 6	Stated to be drinking previous to admission; not ill during the last 6 months.	25th Aug.	..	1876. 30th Aug.	6 days ..	Appeared to be suffering from dyspepsia; the symptoms were not in any respect those of enteric fever.
24. Mann, 2-16th Regiment.	22 0	0 7	Good	31st Aug.	7th Oct.	..	38 days..	High temperature, flushed face, full bounding pulse, headache and pain in back; bowels constipated; general ill health.
25. Frimage 2-16th Regiment.	21 7	0 7	Good	31st Aug.	6th Oct.	..	37 days..	Usual symptoms of simple continued fever which afterwards became typhoid in character; there was diarrhœa, pain in iliac fossa, no tympanitis; high temperature ranging from 100 to 104; a regular pulse of between 90 to 100 of fair strength; some headache; tongue slightly furred and moist.
26. Boon, 2-16th Regiment.	24 0	0 7	Good	6th Sept.	..	1876. 14th Sept.	8 days ..	Prostration, high temperature; pains in back and congestion of lungs.
27. Smith, 2-16th Regiment.	24 0	0 7	Very good ..	14th Sept.	..	25th Sept.	11 days..	Considerable pyrexia, with general ill-health of 2 or 3 days' standing.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
No	None	Nil	3. Characteristic on abdomen. 4. Pale, yellow liquid. 5. 6. 7. 8. } No.
No	None	Nil	3. None. 4. 5. 6. 7. 8. } No.
No	None	Peyer's patches throughout ileum much enlarged; no ulceration, but towards the cœcum several groups were highly inflamed; ascending colon congested. Several of the solitary glands were enlarged.	3. 4. 5 6. 7. 8. } No.
No	None	Nil	3. No spots. 4. Light yellow. 5. 6. 7. 8. } None.
No	None	Enlargement of Peyer's patches especially near ileo-cæcal valve; 7 or 8 of the groups were ulcerated, the largest ulceration at margin of ileo-cæcal valve. spleen normal.	5. 6. 7. 8. } No.
No	None	Nil	3. None. 4. Dark at first, then pale yellow. 5. 6. 7. 8. } No.
No	None	Nil	3. None. 4. Light, yellow liquid. 5. 6. 7. 8. } No.
No	None	Agminated glands in ileum enlarged; one had ulcerated 2 feet above ileo cæcal valve. 13 small ulcers situated within 6 inches of ileo cæcal valve; some clearly had defined edges and all of recent origin; mucous membrane of colon intensely congested. Spleen large, friable, weight 16 ounces.	3. 4. 5. 6. 7. 8. } No.
No	None	Several enlarged and ulcerated glands in lower part of ileum; the lesions were most marked near ileo-cæcal valve, where nearly the whole gut was involved; patches of congestion in various parts of intestines running into ulceration at one or two points. Spleen enlarged.	3. None. 4. Dark, offensive; containing blood. 5. 6. 7. 8. } No.

SECUNDERABAD

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
28. George, 2-16th Regiment.	20 0	0 7	Good ..	1876. 19th Sept.	1876. 19th Oct.	..	30 days..	High general fever; temperature ranging from 102 to 103·6. Tongue coated, bowels inclined to be loose; gurgling in iliac fossa with slight pain in pressure.
29. Bennet, 2-16th Regiment.	21 0	0 8	Delicate ..	3rd Oct.	1877. 5th Jan.	..	94 days..	Hæmorrhoids. Subsequently an abscess formed in ischio rectal fossa with purulent discharge and irritative fever which assumed a typhoid character with a high temperature ranging from 100·8 to 103·6, weak pulse, short respiration, brown and moist tongue.
30. MacIlroy, 2-16th Regiment.	37 0	0 8	Good	4th. Oct.	1876. 8th Dec.	..	65 days..	Simple continued fever with a hot skin; temperature ranging from 100 to 103·8. Headache, lassitude and general ill-health; tongue slightly coated, no diarrhœa, no abdominal tenderness.
31. Mrs. Rodgers, 2-16th Regiment.	19 0	0 8	Fair; Ovaritis	28th Sept.	3rd Oct.	..	34 days..	General pyrexia, hot, dry skin, headache, pain over scrobiculus cordis and furred tongue.
32. Melville, 2-16th Regiment.	24 0	0 8	Very good ..	7th Oct.	1st Oct.	1876. 16th Oct.	9 days..	Headache and great heat of skin. Temperature 102., pulse 112, with a dry glazed tongue and general malaise.
33. Douglas, 2-16th Regiment.	37 0	0 11	Good	1877. 6th Jan.	..	1877. 2nd Feb.	27 days..	Symptoms of remittent fever; a high temperature 103 to 103·8; dry skin. Tongue coated; no diarrhœa. No spots on skin; headache; pulse 80, regular and good volume.
34. Lightfoot, 2-16th Regiment.	35 0	1 0	Good	10th Feb.	1877. 15th April.	..	64 days..	High temperature 104; severe headache, pain in back furred tongue, pulse 100; bowels confined.
35. Barrett, 2-16th Regiment.	19 0	1 0	Good	26th April.	24th July.	..	28 days..	High temperature 102·; frontal headache, dry skin, quick pulse, and dry furred tongue; diarrhœa. No abdominal pain in tympanitis.
36. Bourne, 2-16th Regiment.	22 0	1 0	Good	29th April.	6th June.	..	38 days..	Pyrexia; high temperature 103·4, and general weakness.

—(*Continued*).

Particulars in regard to exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
No	None	Nil	3. None. 4. Liquid, light yellow. 5. 6. 7. 8. } No.
None	None	Nil	3. Raised papular eruption on abdomen, chest and thighs. 4. Dark at first and yellow liquid. 5. 6. 7. 8. } No.
No	None	Nil	3. Pink spots on abdomen. 4. Liquid yellow. 5. 6. 7. 8. } No.
No	None	Nil	3. No. 4. Dark, offensive. 5. 6. 7. 8. } No.
No	None	Peyer's patches throughout ileum enlarged; ulceration commencing in some of them. One or two ulcers near the caput cœci.	3. 4. 5. 6. 7. 8. } No.
No	None	Peritoneum highly inflamed, and partially adherent. Congestion of mucous membrane of intestines especially near lower part of ileum and ileo-cæcal valve; 5 or 6 circular ulcers in ileum of the size of a sixpence had perforated. Peyer's glands unaffected; spleen normal.	3. 4. 5. 6. 7. 8. } No.
No	None	Nil	3. Dusky, point over trunk afterwards becoming more distinct and characteristic. 4. Relaxed yellowish. 5. 6. 7. 8. } No.
No	None	Nil	3. Distinct characteristic on abdomen. 4. 5. 6. 7. 8. } No.
No	None	Nil	3. Seven or eight characteristic spots on abdomen and two or three on chest. 4. Dark brown, offensive. 5. 6. 7. 8. } No.

SECUNDERABAD

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
37. Rowden, 2-16th Regiment.	Y. M. 20 0	Y. M. 1 0	Good	1877. 6th May.	..	1877. 20th May.	14 days..	Headache; giddiness; weakness; high temperature (103″); dry skin and a marked pallor of countenance, with diarrhœa; no gurgling or pain in iliac region.
38. Holbrook, 2-16th Regiment.	21 0	1 6	Delicate ..	1st Aug.	..	9th Aug.	9 days ..	General pyrexia; tenderness and gurgling in right iliac fossa; diarrhœa; hot dry skin; tongue brown and dry; temperature 104·2.
39. Bray, 2-16th Regiment.	21 0	1 7	Good	12th Oct.	..	..	Still in hospital.	Skin hot and dry; temperature ranging from 100 to 103; tongue coated; no appetite; pulse quick; bowels acting naturally.
40. Bullis, 2-16th Regiment.	28 5	1 8	Good	22nd Oct.	..	3rd Nov.	13 days..	Hot dry skin; quick full pulse; tongue coated; severe headache; bowels constipated.

KAMP

1. Camp, Royal Artillery.	24 6	3 8	Good for six months previous to admission.	1877. 27th June.	..	1877. 4th July.	7 days ..	Slight feverish symptoms on admission; bowels constipated; tongue coated; pulse quick but regular. For the first two days great want of sleep; on the fifth morning after admission slightly delirious. Fever high and continuous; no diarrhœa, tenderness or gurgling in iliac fossa. Took his nourishment well.
2. Mary Ann Schofield, 33rd Regiment.	27 0	1 1	Indifferent: had been suffering much from dyspepsia.	1876. 4th Jan.	..	1876. 18th Jan.	15 days..	Gastric and bowel irritation indicated by diarrhœa and vomiting.

CANNA

1. Sutton, 43rd Regiment.	23 0	0 2	Had a short time previously a dysenteric attack.	1872. 20th Dec.	..	1872. 25th Dec.	6 days..	General malaise; some hæmorrhage from bowels; pain in the abdomen.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
No	None	15 or 16 groups of Peyer's glands in ileum enlarged, some pale, others purple with congestion, while 2 or 3 near ileo-cæcal valve present slightly ulcerated surfaces; mucous membrane much reddened; much congestion in ascending colon; spleen normal.	3. Rose-colored spots on abdomen. 4. Dark at first, then yellow. 5. 6. 7. 8. } No.
No	None	Solitary glands at termination of ileum near ileo-cæcal valve ulcerated, some more than others; Peyer's patches congested and infiltrated, but not ulcerated; remaining portion of small and large intestines normal; spleen normal, much congested, very friable.	3. None. 4. Liquid, yellow ochry color. 5. 6. 7. 8. } No.
No	None	Nil	3. None 4. Yellow, liquid. 5. 6. 7. } No. 8. Yes.
No	None	In the cæcum there were several ulcers of various shapes and sizes, and for about 8 inches up the ileum there were some small circular ulcers with raised edges, varying in size from sixpence to a shilling; one of these ulcerated through intestine close to ileo-cæcal valve. Mucous membrane of lower portion of ileum very dark in color and looked as if gangrene was commencing; ascending portion of colon congested; liver enlarged and nutmeg in appearance; spleen enlarged and flabby.	3. None. 4. At first dark and very offensive, afterwards greenish and containing blood. 5. 6. 7. } No. 8. Yes.

TEE.

No record	No record	Liver healthy in structure; gall-bladder full of bile; kidneys healthy; spleen healthy; bladder full of urine; intestines, duodenum and jejunum were healthy; slight congestion throughout the ileum with a few minute ulcers scattered throughout its lower portion; marks of old ulceration in Peyer's patches; large intestine healthy.	3. None. 4. No diarrhœa, suffered from constipation.
In no way exposed to emanations of either kind as far as can be discovered.	None known	No *post-mortem* examination ..	This case was admitted into hospital as one of "simple continued fever," but after death, in accordance with instruction received, this disease was changed to "enteric fever" the original disease being erased.

NORE.

Exposed only to effluvium from latrines in barracks.	....	In duodenum solitary glands ulcerated. In ileum prominent and enlarged with extensive ulceration of Peyer's patches; thinning of intestinal tube and coagula in rectum; spleen congested.	

CANNANORE

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
2. George, 43rd Regiment.	21	0	0	2	Five days prior to admission had diarrhœa and passed blood, not in hospital.	1872. 21st Dec.	1873. 11th Feb.	..	54 days ..	Pyrexia; headache; subsequently abdominal tenderness and diarrhœa with characteristic evacuations.
3. Addison, 43rd Regiment.	19	0	0	2	Good	23rd Dec.	..	1872. 29th Dec.	10 days ..	Pyrexia; abdominal pain; diarrhœa and sanguineous stool.
4. W. Dolphin, 43rd Regiment.	20	0	0	2	Good	28th Dec.	1873. 11th Feb.	..	46 days ..	Pyrexia without abdominal symptoms; subsequently epistaxis.
5. Connars, 43rd Regiment.	20	6	0	2	Good; epistaxis prior to admission.	30th Dec.	..	1873. 9th Jan.	12 days ..	Pyrexia; abdominal pain; tenderness; gurgling; diarrhœa.
6. Aird, 43rd Regiment.	19	9	0	2	Good; had dysentery seven days before.	30th Dec.	1873. 16th Jan.	..	19 days ..	Pyrexia; no abdominal symptoms except slight pain.
7. Monk, 43rd Regiment.	24	0	0	2	Weakly for some time previously.	28th Dec.	..	1872. 30th Dec.	4 days ..	Insomnia; headache; pyrexia with constipation.
8. Hall, 43rd Regiment.	21	0	0	2	Healthy ..	28th Dec.	1873. 11th Feb.	..	47 days ..	Pyrexia; anorexia; abdominal pain; tenderness; and gurgling and diarrhœa.
9. Jones, 43rd Regiment.	23	0	0	2	Healthy ..	27th Dec.	11th Feb.	..	46 days ..	Pyrexia; abdominal pain; tenderness and diarrhœa.
10. Button, 43rd Regiment.	21	0	0	2	Healthy ..	27th Dec.	20th Jan.	..	24 days ..	Pyrexia; rachalgia; abdominal pain; tenderness and diarrhœa.
11. Felton, 43rd Regiment.	20	0	0	2	Healthy ..	27th Dec.	16th Mar.	..	78 days ..	Pyrexia; malaise; abdominal pain; and tenderness with diarrhœa.
12. Charter, 43rd Regiment.	21	0	0	2	Healthy ..	26th Dec.	20th Jan.	..	23 days ..	Pyrexia without abdominal symptoms.
13. Barnett, 43rd Regiment.	24	0	0	2	Healthy ..	26th Dec.	11th Feb.	..	43 days ..	Pyrexia with abdominal pain and diarrhœa.
14. Eccleston, 43rd Regiment.	20	6	0	3	Healthy ..	30th Dec.	11th Feb.	..	43 days ..	Pyrexia, ; abdominal tenderness and pain, with diarrhœa and characteristic evacuations.
15. Gammon, 43rd Regiment.	23	0	0	3	Healthy ..	30th Dec.	16th Jan.	..	14 days ..	Headache; nausea; slight abdominal tenderness; no diarrhœa.
16. Sevenoaks, 43rd Regiment.	25	0	0	2	Healthy ..	1873. 4th Jan.	11th Feb.	..	40 days ..	Sleeplessness; pain over ileo-cæcal valve; diarrhœa; mental distress.
17. Gordon, 43rd Regiment.	27	0	0	2	Healthy ..	4th Jan.	16th Jan.	..	14 days ..	Pyrexia; inconsiderable pain and tenderness in abdomen; diarrhœa.
18. Davies, 43rd Regiment.	23	0	0	2	Healthy ..	6th Jan.	11th Feb.	..	38 days ..	Pyrexia; slight pain at umbilicus; malaise; no diarrhœa at first.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Exposed only to effluvium from latrines in barracks.	....	....	
Ditto	....	Thinning of intestinal walls; solitary and aggregated glands tumescent and ulcerated in ileum within 4 inches of valve; mesenteric glands enlarged; spleen not noted.	
Ditto	....	....	
Ditto	....	Spleen and mesenteric glands enlarged and congested; Peyer's patches thickened, prominent and ulcerated; solitary glands unaffected; intestines contained characteristic evacuations.	
Ditto	....	....	
Ditto	....	Extensive ulceration of Peyer's patches; in the vicinity of the valve a gangrenous spot; the solitary glands were not affected.	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	

CANNANORE

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
19. Lovegrove, 43rd Regiment.	25	0	0	3	Healthy ..	1873. 25th Jan.	1873. 10th Mar.	..	50 days ..	Severe pyrexia; rigors; tenderness and gurgling in abdomen. Diarrhœa.
20. Hacket, 43rd Regiment.	23	7	0	3	Weakly; constantly ailing.	25th Jan.	27th Feb.	..	39 days ..	Pyrexia; headache; pain in right iliac fossa; subsequently diarrhœa with characteristic evacuations.
21. A. Dolphin, 43rd Regiment.	27	0	0	3	Healthy ..	27th Jan.	..	1873. 8th Feb.	14 days ..	Pyrexia and abdominal pain and tenderness.
22. Appaley, 43rd Regiment.	20	0	0	3	Is a weakly man. His disease was at first supposed to be dysentery.	3rd Feb.	1873. 1st Mar.	..	29 days ..	Excessive debility and foulness of tongue without abdominal symptoms, a little later lenticular spots were observed.
23. Broom, Royal Artillery.	25	0	..		In Royal Artillery Case Book. Had dysenteric diarrhœa just previously.	11th Jan.	..	..	..	Pain, tenderness and gurgling in abdomen; diarrhœa with characteristic evacuations.
24. Long, 43rd Regiment.	24	0	0	2	Weakly ..	1872. 27th Dec.	1873. 11th Feb.	..	43 days ..	Headache, rigors, diarrhœa, abdominal pain, tenderness.
25. Ruse, 43rd Regiment.	20	11	0	3	Dysentery seven days before.	1873. 6th Feb.	19th Feb.	..	16 days ..	Pyrexia and abdominal tenderness.
26. O'Sullivan, 43rd Regiment.	21	0	0	3	Weakly ..	12th Feb.	17th April.	..	67 days ..	Pyrexia, diarrhœa and abdominal tenderness.
27. Taylor, 43rd Regiment.	22	0	0	4	Discharged from hospital with dysentery, December 22nd, 1872.	15th Feb.	1st Mar.	..	10 days ..	Pyrexia, headache, pain in abdomen.
28. Weston, 43rd Regiment.	22	0	0	4	Weakly ..	16th Feb.	..	1873. 3rd Mar.	16 days ..	Pyrexia, severe headache and some diarrhœa.
29. Duddy, 43rd Regiment.	21	9	0	4	Healthy ..	20th Feb.	1873. 22nd Mar.	..	31 days ..	Pyrexia, malaise, diarrhœa and tumescence of abdomen.
30. Spillan, 43rd Regiment.	22	10	0	4	Healthy ..	26th Feb.	15th Mar.	..	21 days ..	Pyrexia, with slight pain and tenderness in abdomen.
31. Armstrong, 43rd Regiment.	20	0	0	4	Weakly ..	27th Feb.	8th April.	..	44 days ..	Pyrexia with slight abdominal pain and diarrhœa.
32. Chapman, 43rd Regiment.	21	9	0	4	Healthy ..	4th Mar.	26th Mar.	..	26 days ..	Malaise, rachalgia, constipation, severe headache.
33. Grey, 43rd Regiment.	20	0	0	5	Healthy ..	23rd Mar.	3rd April.	..	13 days ..	Pyrexia without abdominal symptoms.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Exposed only to effluvium from latrines in barracks.	....	....	
Ditto	....	....	
This man volunteered to nurse his brother Private W. Dolphin (see No. 4) and alone acquired the disease in hospital.	....	Spleen enlarged, congested, friable. Large patches of ulceration in the aggregated glands for one foot above the ileo-cæcal valve; ulceration of the patches and solitary glands in lower part of ileum.	
Exposed only to effluvium from barrack latrines.	....	....	
The latrine conservancy in Royal Artillery barracks, fairly good.	....	Ulceration of Peyer's patches; solitary glands unimplicated. Perforation of intestinal walls with peritonitis and lymph; fæces free in the cavity of the abdomen.	
Exposed only to effluvium from barrack latrines.	....		
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	Spleen engorged and enlarged, but had undergone no structural alteration: mesenteric glands greatly enlarged. Some thinning of intestinal walls with ulceration of Peyer's patches in the vicinity of the valve.	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	
Ditto	....	....	

CANNANORE

Name of the Patient.	Age in Years and Months.		Period in India in Years and Months.		Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2		3		4	5	6	7	8	9
	Y.	M.	Y.	M.						
34. Rourke, 43rd Regiment.	21	0	0	5	Healthy ..	1873. 3rd April.	..	1873. 9th April.	9 days..	Pyrexia without abdominal symptoms on admission.
35. Hardinge, 43rd Regiment.	26	0	0	5	Healthy ..	7th April.	1873. 27th April.	..	22 days..	Pyrexia without abdominal symptoms on admission.
36. Parrow, 43rd Regiment.	25	0	0	5	Rather weakly..	7th April.	3rd May.	..	30 days..	Pyrexia without abdominal symptoms on admission.
37. Wade, 43rd Regiment.	20	0	0	5	Healthy ..	10th Apr.	29th April.	..	23 days..	Pyrexia without abdominal symptoms on admission.
38. Ryland, 43rd Regiment.	23	0	0	6	Healthy. Had dysenteric symptoms eight days before admission.	18th Apr.	13th May.	..	29 days..	Pyrexia with pain, tenderness, gurgling and diarrhœa.
39. Smythe, 43rd Regiment.	34	0	0	4	Healthy ..	9th Mar.	30th Mar.	..	22 days..	Pyrexia without abdominal symptoms.
40. Ransom, 43rd Regiment.	22	0	0	5	Delicate ..	20th April.	2nd May.	..	16 days..	Pyrexia with abdominal pain and diarrhœa.
41. Trinder, 43rd Regiment.	23	0	0	5	Discharged from hospital seven days previously with diarrhœa.	18th May.	16th July.	..	61 days..	Pain in abdomen; pyrexia; epistaxis; involuntary action of muscles. No diarrhœa.
42. Wright, 43rd Regiment.	22	0	0	11	Healthy ..	19th Sept.	..	1873. 25th Sept.	8 days..	Pyrexia; rigors; malaise; diarrhœa; abdominal tenderness.
43. Moulton, 43rd Regiment.	26	0	0	11	Healthy ..	14th Sept.	15th Nov.	..	63 days..	Pyrexia, diarrhœa and abdominal pain.
44. Rodgers, 43rd Regiment.	22	0	..		Had hepatic congestion 17 days before admission.	1874. 6th Oct.	1874. 3rd Dec.	..	60 days..	Slight pyrexia on admission without abdominal symptoms; diarrhœa absent; constipation.
45. Osborne, 43rd Regiment.	21	8	2	2	Weakly ..	1875. 6th Jan.	1875. 14th July.	..	41 days..	Pyrexia only, without abdominal symptoms on admission.
46. Death, 43rd Regiment.	25	0	2	6	Healthy ..	15th April.	24th May.	..	39 days..	Pyrexia; rachalgia; no abdominal symptoms; constipation.
47. Green, 43rd Regiment.	27	4	1	1	Had dysentery two months previous to admission.	26th April.	2nd June.	..	39 days..	Pyrexia and diarrhœa only at first.
48. Rooney, 43rd Regiment.	22	6	2	6	Healthy ..	28th April.	30th May.	..	34 days..	Pyrexia; no abdominal symptoms except diarrhœa upon admission.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Exposed only to effluvium from barrack latrines.	....	Spleen enlarged, congested, friable; tumescence of mucous membrane in ileum with vivid discoloration and ulceration of Peyer's patches in the vicinity of the ileo-cæcal valve. The solitary glands were also in some instances swollen and ul cerated.	
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....	Spleen enlarged, congested, friable; in the ileum Peyer's patches tumefied, enlarged; ulceration of solitary glands in ileum and cæcum.	
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		
Ditto ..	....		

SAINT THOMAS'

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
1. Larley, Royal Artillery.	22 0	2 6	Healthy ..	1877. 8th April.	..	1878. 12th April.	6 days..	Was suffering from febrile symptoms; hot skin; furred tongue; and tremulous; had been drinking for some time, but not to excess.
2. Burroughs, Royal Artillery.	46 0	8 0	Healthy ..	1877. 22nd Aug. Admitted with simple continued fever; diagnosis too uncertain for any subsequent change of disease.	1877. 14th Nov.	..	60 days to convalescence.	Admitted as a case of *simple continued fever.* Headache, torpor, giddiness, pain in the eye, accompanied the pyrexia.

PALA

1. Sandford, 21st Regiment.	29 0	3 8	Weakly ..	1873. 1st Dec.	..	1873. 5th Dec.	5 days ..	Simple continued fever November 26th, 1873. Headache, anorexia, languor, costiveness, scanty urine. No rash; enteric fever diagnosed on Dec. 1st, 1873, when rose rash was found sparsely dispersed over abdomen. Diarrhœa and tympanitis; typhoid stools.

MALLIA

1 Gadsby, 48th Regiment.	23 4	1 3	Good	1877. 8th June.	1877. 11th July.	Recovered.	Computed as 43 days from commencement of disease to final discharge.	General malaise; feverish sensations; diarrhœa, with yellowish stools; expression rather stupid; tongue dry; evening temperature 101·8; malar flush; pulse quickening to 95 per minute. Stated he had felt unwell for more than a week previous.

MOUNT.

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
There is no evidence of his having been exposed to emanations of animal or vegetable origin.	None	Liver 4 lbs. 2 oz., healthy; gall-bladder full of light green bile; spleen 12 oz., congested, firm; kidneys, left 6 oz., right 5 oz., capsules non-adherent, both healthy; stomach highly congested at pyloric end; *intestines*—small, ileum studded with ulcers throughout; large, healthy.	1. No. 2. Not diagnosed as one of enteric fever until after death. 3. No eruption. 4. No history of diarrhœa or hæmorrhage from the bowels. 5. Does not appear to have suffered from ague or other disease of a periodic character. 6. 7. 8. } No. 9. No lesions were noticed in Peyer's patches, mesenteric glands, or spleen.
None	None.		

VERAM.

None stated	Unknown	Spleen much enlarged, 1 lb. 3 oz.; liver 4 lbs. 4 oz.; membrane of small intestine and Peyer's glands much congested and swollen; no ulceration.	Had been in Kurrachi in 1869. Arrived four days before attack from Madras. Had had no shivering fits before admission. No history of ague during past year.

POORAM.

No particular exposure, except that the condition of the latrines for some time previous had been unsatisfactory owing to the barrack toties refusing to perform their duties properly, the result being that the tubs were not cleaned according to regulation.	No	Not fatal	The patient had never suffered from any form of periodic fever. His Indian service was all in Cannanore and this station; there does not appear to be any tendency to ague at the station The patient has enjoyed good health; since attack has not suffered from ague. At date of attack there had been several cases returned as "simple continued fever," which in some cases appeared subsequently to assume periodic characters; but there was no prevalence of malarious disease. There was a very scanty eruption of rose-colored spots over the abdomen, the first appearing on the computed twelfth day and faded away in about 48 hours; the second crop appeared on the fifteenth computed day and had faded by next morning: it was succeeded by one single spot, after which there was no further eruption. There were never more than three out at one time, and they were lenticular, of a pale rose color and slightly raised, disappearing on pressure, quickly returning after removal of the finger. The attack did not come on with any appearance like intermittent or remittent fever. The first and only case returned as enteric fever at this station.

RAN

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
1. Simms, 67th Regiment.	29 0	0 4	Good	1873. 3rd Mar.	1873. 22nd April.	..	50 days..	Admitted with heat of skin; headache and languid pulse. Roseolar rash over lower part of abdomen and thighs.
2. English, 67th Regiment.	19 0	0 3	Good	10th Mar.	7th April.	..	28 days..	Admitted with headache, hot skin, quick pulse, coated tongue. Felt unwell for some days previous; had no regular rigors, but had chills occasionally. Bowels confined.
3. Powell, 67th Regiment.	21 0	0 3	Good	10th Mar.	10th April.	..	22 days..	Admitted with headache, giddiness, heat of skin, quick throbbing pulse, coated tongue. Bowels regular; subsequently tenderness over cæcum and crepitation with diarrhœa.
4. Taylor, 67th Regiment.	21 0	..	Good	8th May.	27th May.	..	20 days..	No record .. ..
5. Barber, 67th Regiment.	20 0	..	Good	1st July.	..	1873. 1st July.	1 day ..	Hot skin, loaded tongue, headache, delirium, sleeplessness; not much looseness of bowels; no abdominal tenderness.
6. Collier, 21st Regiment.	28 0	1 4	In 1872 three admissions for debility. Invalided to England for sunstroke. Health latterly good.	1877. 18th Aug.	1877. 8th Sept.	..	22 days ..	Low fever, malaise, great debility; creamy tongue. No rash.

THYET

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1. Steers, 67th Regiment.	22 0	..	Unknown ..	1874. 17th July.	1874. 26th Sept.	Recovered.	73 days ..	No record .. ..
2. Painter, 67th Regiment.	22 0	0 6	Health good; had been five or six days ill before admission.	26th July.	..	1874. 29th July.	4 days ..	Fever, headache, general debility; pulse feeble, tongue red and dry; has had diarrhœa; pain over hepatic region on pressure. No spots on skin; subsequently diarrhœa; tongue dry and parched; vomiting and purging; cold extremities.
3. Clarke, 67th Regiment.	22 0	2 0	....	23rd Nov.	18th Dec.	..	26 days ..	Fever, headache, pain in loins, tongue coated, pulse feeble and quick; no skin cruption. Bowels frequently moved, stools fluid and of a dark color; crepitation over cæcum and tenderness over stomach and bowels.

GOON.

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Unknown	Unknown.		
Unknown	Unknown.		
Unknown	Unknown.		
Unknown	Unknown.		
Unknown	Unknown	The patches of mucous follicles in the ileo-cæcal valve were thickened and slightly elevated; six ulcers varying from 1 to 1½ inches long and from ½ to 1 inch broad were situated in the muscular coat of intestine; the solitary mucous follicles of the ileum and cæcum were softened and ulcerated.	
No such exposure	None apparent	....	Had been in Kurrachi. No history of ague. Diarrhœa on fifth day, foul scybalous stools. Temperature 101° to 103°8, but generally highest in the morning. Convalescent on tenth day; hair fell off. No ague since.

MYO.

Unknown	Unknown..		
Unknown	Unknown.	Stomach congested in patches; ileum lower portion congested, especially in the vicinity of Peyer's glands, which were enlarged and prominent. Ileo-cæcal valve and intestine above was much congested; no ulceration.	
Unknown	Unknown.		

THYETMYO

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
4. Kane, 67th Regiment.	Y. 33 M. 0	Y. 1 M. 0	Good	1874. 26th Nov.	..	1874. 3rd Dec.	8 days ..	Fever; pain in lower extremities, back and head; depression; foul tongue. Roseolar eruption over chest and upper portion of abdomen; subsequently diarrhœa, vomiting, prostration.
5. Fitzallen, 67th Regiment.	41 0	3 0	Good	1875. 2nd Jan.	..	1875. 9th Jan.	7 days ..	Fever, headache, furred tongue; subsequently sickness of stomach; diarrhœa; swelling of abdomen; acid eructations.
6. Mrs. Fitzallen, 67th Regiment.	..	..	Good	6th Jan.	1875. 31st March	..	105 days..	Fever; pain in limbs; tongue white and dry; pulse feeble, frequent.
7. Banfield, 67th Regiment.	24 0	0 10	Good	5th Aug.	5th Sept.	..	32 days ..	Fever; headache; feebleness; sleeplessness and diarrhœa; considerable tenderness over abdomen and vomiting; delirium.
8. Hospital Apprentice T. Lawrence, 67th Regiment.	24 0	Born in India.	Good	1876. 3rd Feb.	1876. 24th Feb.	..	22 days ..	Pain over hypogastrium. high fever; diarrhœa; characteristic ochre-colored stools; frontal headache; irritability of stomach. Temperature 104°; tongue tremulous and covered with a yellowish, creamy fur; tenderness and griping over iliac region.

PORT BLAIR,

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
2. Farrelly, 2-10th Regiment.	32 0	Not known.	Not known ..	1871. 6th Sept.	1871. 27th Nov.	..	84 days ..	Admitted for ague. Daily attacks of fever; headache; thirst; foul tongue; loss of appetite; occasional diarrhœa. On sixteenth day disease changed to enteric fever. There were then present 5 or 6 spots on chest, described as "bright red"; bowels moved three or four times daily, stools described as "fluid, of a dark color"; pain and tenderness on pressure over right iliac region. Convalescence very slow.

—(*Continued*).

Particulars in regard to Exposure, or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
Uncertain	Unknown	Lower third of ileum congested and small points of extravasated blood visible; no ulceration; Peyer's glands somewhat raised.	
Unknown	Unknown	Congestion of lower and upper third of small intestines; small isolated patches of congestion over ileum; no ulceration; Peyer's patches enlarged.	

ANDAMANS.

None known; was taken ill three days after his arrival in this station from Rangoon.	Unknown	....	2. Diagnosed as enteric fever on the occurrence of suspicious-looking spots on the "chest"; slight diarrhœa, dusky color of face, slight headache, loss of sleep, thirst, pain on percussion over the ascending and transverse colon. 3. Eruption described as "suspicious looking spots," also "4 or 5 bright red spots on his chest;" these had disappeared on the thirty-ninth day. 4. Diarrhœa present; generally three or four stools daily, described as "fluid of a dark color." 5. Cannot be ascertained. 6. Had very recently arrived from Rangoon, where in my experience malarial disease does not prevail. 7. Cannot be ascertained. 8. Thirteen cases of malarial diseases were treated in hospital during the year.

PORT BLAIR,

Name of the Patient.	Age in Years and Months.	Period in India in Years and Months.	Health prior to Attack; nature of Illness, if any, with which affected.	Date of Admission with Enteric Fever.	Date of Discharge.	Date of Death.	Duration of Attack in Days.	A concise statement of Symptoms on Admission.
1	2	3	4	5	6	7	8	9
	Y. M.	Y. M.						
1. Watson, 1-21st Regiment.	24 10	1 11	Seems to have enjoyed excellent health, and appeared when inspected at Madras prior to embarkation for this station to be perfectly well.	1875. 29th Jan.	..	1875. 16th Feb.	24 days ..	Sickness; headache; general malaise; pain in back; anorexia; foul tongue; high temperature; bowels loose. Slight delirium at night. On the ninth day the disease was changed to enteric fever. There were then present "numerous rose-colored spots over the abdomen, each spot distinct and fading on pressure"; gurgling in right iliac fossa; subsultus tendinum; constant delirium; stools liquid and light colored. Died unconscious.

ANDAMANS—(*Continued*).

Particulars in regard to Exposure or otherwise to Emanations of Animal or Vegetable Origin.	Any other apparent cause of Attack? infectious or otherwise.	*Post-mortem* Appearances.	Any other particulars likely to elucidate the Etiology of the Disease in individual Cases.
10	11	12	13
None known	None known	Lungs healthy ; heart healthy ; large intestines distended ; "spleen deeply congested, enlarged, and very friable, weight 1 lb. ; the small intestines as regards their mucous membrane were congested ; Peyer's patches being distinct ; towards ileo-cæcal valve this congestion was most marked and ulceration had commenced in two or three spots ; the large intestine was perfectly healthy."	2. Diagnosed as enteric fever on the eleventh day on the occurrence of a fresh crop of spots. 3. The eruption described as several rose-colored spots on the abdomen, each spot distinct, fading on pressure, but not with a distinct margin. 4. "Diarrhœa very troublesome, stools very liquid and dark green color." Bowels rather loose, motions very watery." 5. Cannot be ascertained. 6. Had arrived from Madras fourteen days previously. 7. 8. There were no cases admitted to hospital for malarial disease that year.

APPENDIX B.

NOTES SUPPLEMENTARY TO CERTAIN PARAGRAPHS OF THE PRECEDING REPORT.

With a view to making this report as complete as circumstances admit, I desire to add in this shape the results of my studies on the subject of fevers during the time the text was in process of being printed, my present notes being arranged with reference to the paragraphs of my report to which more particularly they have reference, namely:—

Note 1, *Paragraph* 2.—*Definition.*—Dr. Copland thus defines *specific typhoid fever*: Slight rigors or chilliness, diarrhœa, frequency of pulse, febrile symptoms often remittent, tongue red at its point or edges, afterwards brown and dry; abdominal distension and tenderness; isolated rose-colored spots appearing between the seventh and fourteenth days in successive eruptions; increasing diarrhœa and tympanitis; after death lesions of the solitary and aggregated glands of the ileum, and enlargement of the mesenteric glands; occurring sporadically, endemically, and epidemically; infectious in circumstances favoring infection.

Incubation.—The attack may occur immediately. Dr. Copland relates a case in which inhalation of decomposing fæcal emanations was instantly followed by illness which developed into enteric fever, the subject of attack recovering with difficulty. Of 112 cases described in France, the attack occurred suddenly in 73. In Britain it usually approaches more insidiously.

Modification of Type.—In 1834 Chomel observed that the concurrence of particular symptoms constitutes varieties of fever to which distinct names have been given by authors as if they were distinct affections. He enumerates the following as varieties of *typhoid* fever, namely:—1. *Inflammatory,* characterised by the early occurrence, in addition to ordinary febrile symptoms, of headache, muscular debility, disposition to hæmorrhages, dry tongue, diarrhœa and miliary eruptions. About the eighth day the form changes to adynamic and ataxic. In two cases he found that death occurred in consequence of perforation of the bowel. He never met with inflammatory fever which was not a variety of the typhoid affection. 2. *Bilious,* characterised by yellowness of skin, nausea, vomiting of bile, bilious evacuations, bitterness and dryness in the mouth, yellow or greenish coating of the tongue, depravation of taste, smell and touch; the duration of these symptoms seven to fifteen days. 3. *Mucous,* attended by great debility, pale or swollen face, muscles soft, mouth pasty; breath, saliva, perspiration and urine acid, alvine evacuations, mucous or glairy; after a short time it is replaced by the adynamic or ataxic form. 4. *Ataxic,* distinguished by delirium, cries, threats, efforts to strike or escape; sometimes by wild delirium, heaviness, alteration or perversion of the senses, twitchings, convulsions, rigidity, &c. In some cases there is disaccord between the symptoms; while the pulse is rapid, the skin is not hot, or one part is cold whilst the rest is very warm; or while the face expresses a disease almost inevitably fatal, the pulse is hardly affected. It is added, however, that ataxic symptoms do not belong exclusively to fever, but may co-exist with visceral inflammation, puerperal, eruptive, and other acute diseases. 5. *Slow Nervous Typhoid Fever,* general indifference, lassitude, heaviness, dejection, slight headache, pulse frequent and weak, wakefulness, dryness of mouth but no thirst; delirium, if present, not violent; confusion between thought and action; muttering. 6. *Adynamic Typhoid Fever* muscular debility, simulating paralysis, great mental debility, headache, early stupor or wakefulness; mouth covered with a thick layer of dry mucus, great meteorism, alvine evacuations fetid and involuntary, urine and perspiration fetid, petechiæ; skin at first warm and dry, afterwards cold. In the course of his remarks, M. Chomel makes no allusion to either or any of these forms of fever having a specific pythogenic origin. He applied the term *typhoid* to that form of continued fever which he had observed in Paris, and believed that this disease, modified by particular circumstances, constituted the entro-mesenteric fever of Petit and Serres, the *exanthème intestinal* of Andral, and *dothen-enterite* of Brettenneau. Sir Thomas Watson writing in 1838 states that for a decade before the occurrence of cholera in London, the prevalent form of fever was that to which Cullen had given the name of *Synocha* and defined:—"Calor plurimum auctus; pulsus frequens, validus et durus; urina rubra; sensorii functiones parum turbatæ." Antiphlogistic treatment was then well borne; no eruption appeared on the skin, but the glands of Peyer were invariably affected. After the occurrence of cholera, and at the date he wrote, the most frequent type of the prevailing fever was Cullen's *Synochus,* that is a compound of *synocha* and *typhus.* "Febris ex synocha et typho composita; initio synocha, progressu et versus finem typhus." And he adds, "the typhoid is now the prevailing type; after death we seldom detect any disease of the agminated glands of the intestine; the peculiar rash scarcely ever fails to show itself."

Note 2, Paragraph 3.—Symptoms—According to Periods.—Chomel describes the symptoms attending typhoid fever with reference to stages or periods of the disease, each so-called period representing a week. In the *first*, the expression of the countenance is apathetic, intelligence is diminished, debility obliges the patient to lie on his back. There is frontal headache; the secretions of the mouth are thick; the tip and edges of the tongue red, with a white line on either side; the mouth becomes dry, and as it does so, the mucous membrane assumes a uniform red color. There is generally strong reaction of the circulation; skin dry and hot; perspiration acid; urine scanty, high colored, fetid; epistaxis of common occurrence. In the *second*, the characteristic eruption appears. There may be retention of urine, dysphagia, involuntary passing of the evacuations, sloughing under pressure, stupor, coma, delirium; pulse small, weak, trembling, more or less severe exacerbations in the evening; intestinal hæmorrhage, and tympanitis. In the *third* the symptoms either improve or become aggravated; abscesses at times appear in parts of the body that have not been irritated.

Pulse.—Should it in any instance reach 130 or 140, the attack is severe, and in most cases the patient dies.

Tongue in some instances is glazed as if with a thin dry crust over the abraded mucous membrane; in others dry and brown, its edges and tip red; then in the centre a white fur which gradually becomes a brown streak, and is the first step to dryness and blackness.

Intestinal Hæmorrhage.—The quantity of blood evacuated may vary up to several pints; the consistence of the blood may be fluid or clotted, its color bright red or dark. The flow may take place suddenly and in large quantity, or in smaller quantities at intervals. The bleeding may proceed from softened mucous membrane, occurring in such cases as an exudation; it may occur from ulcers opening into some of the mesenteric veins, but this is not a necessary consequence of ulceration, for the vessels are usually obliterated prior to their erosion. Sometimes blood is poured into the bowel without being evacuated. Hæmorrhage may occur in other forms; petechiæ, purple spots, and bruise-like blotches. In such instances, hæmorrhage is of the passive kind, and its occurrence of the worst omen. They are generally attended by a peculiar fetor from the patient's body, and by other indications of a putrid condition. In cases of Indian endemic fever, however, fetid emanations are by no means uncommon. Hæmorrhages in various forms may also occur in other types of fever than specific typhoid; epistaxis was recorded by Dr. Twining in endemic Indian fever, and is of frequent occurrence in *synocha* or inflammatory fever; flows take place in relapsing or famine fever, in camp or putrid fever, and in follicular enteritis. In India, the portal veins thus relieve themselves in some cases of hepatic congestion, the discharge in such instances being from the rectal ramifications.

Delirium.—According to some authors the delirium of typhoid fever is distinguished by desire on the part of the patient to get out of bed and escape from his room. In fatal cases the stupor augments, the mouth becomes drier, or, if moist, it is only by the secretion of grey viscid mucus mixed with blood, and fetid; respiration is stertorous, pulse feeble, heat decreases, the skin is covered with a glutinous sweat. When perforation of the intestine takes place, the symptoms of typhoid give way to those of peritonitis. This accident is almost invariably fatal. Of forty-two fatal cases recorded by Chomel, death occurred from it in two. In the endemic fever of the West Coast of Africa, the patient offers resistance to supposed restraint; he will dash through a window or on to a balcony, and at times extricate himself in a most extraordinary and dexterous manner. This symptom is in African fever looked upon as almost indicative of approaching death.

Note 3, Paragraph 4.—Eruption.—Of 38 cases of enteric fever recorded as treated in 1873 in the Royal Naval Hospital, Haslar, no eruption appeared in those of milder character. Sir Thomas Watson thus describes the rash of continued fever. It consists of small rosy *blotches* of a roundish or lenticular shape, scarcely raised above the general surface of the skin on which they appear. Chomel states that they vanish under pressure, but it is not so. They vary in intensity of color, and therefore in distinctness. The whiter the skin, the more obvious do the spots appear. In brunettes they may easily escape notice. According to this physician the value of the eruption as a diagnostic is its frequency in typhoid fever, its infrequency in other acute diseases; also that when it does occur in them it is more abundant. He and also Hildebrand state that they have observed it in the typhus of camps; that in some epidemics it was so abundant as to give rise to the term petechial fever. The rash occurs more regularly in some epidemics than in others. In 1838, scarcely a case in the wards of the Middlesex Hospital presented itself without these spots; and so well marked was the eruption and so closely resembling measles, that the prevailing disease was called rubeoloid fever. You cannot well confound this mottled rash with petechiæ which are little specks or dark circular spots resulting from a minute extravasation of blood beneath the cuticle. The specific rash, however, and these petechiæ are sometimes mingled together. The inverse ratio between the rash and the intestinal eruption is remarkable; when the one is prevalent, the other is rare. It would seme that the specific poison displays its elective affinities by sometimes settling upon the mucous glands, sometimes upon the cutaneous tissues, and sometimes by sharing itself unequally between the two.

Sudamina.—This form of eruption, according to Dr. Copland, may occur at the crisis of mucous or pituitous fever in the exhausted stage of typhus, and in the severer form of that disease or camp fever. Sir Thomas Watson observes that the occurrence of sudamina is not peculiar to typhoid fever, but may take place in other febrile diseases. It was more frequent in former times, when the hot method of treatment was followed and profuse perspirations encouraged, than it is now.

Note 4, *Paragraph* 5.—*Temperature.*—The first fall, which usually takes place in the morning, is followed by a very decided rise at night, and for some days the thermometer indicates a series of oscillations. Dr. Twining observed, with reference to temperature in endemic fever of India, that it is well to distinguish between heat, a *symptom,* and the *disease* fever.

Note 5, *Paragraph* 7.—*Sex.*—According to Dr. Copland, males and females are nearly equally liable to typho-enteric fever, and this holds good at all periods of age.

Note 6, *Paragraph* 8.—*Season.*—The influence of season is said to have reference to the nature of the soil, latitude, longitude, elevation and position of a locality in the northern or southern hemisphere. According to Sir Thomas Watson, there is in the colder months a greater risk of inflammatory complications of fevers; in autumn we look more for diarrhœa or for dysenteric complaints engrafting themselves on the disorder. Where the air is close and foul, the symptoms show a much greater tendency to the typhoid type.

Note 7, *Paragraph* 9.—*Residence.*—Chomel observes, that more than two-thirds of all patients treated by him for typhoid fever had lived in Paris less than two years, and that only two had been born there; that residence habituates a person to the causative influences which otherwise give rise to the affection. Drs. Notter, Lind, and Sir Gilbert Blane allude to the fact that when fever occurs on boardship, the younger sailors are the first to suffer from it; and that it is the same with recruits on land. In a defeated army, dispirited or retreating, fatigued and suffering from the usual privations of such conditions, the ravages of fever are terrible.

Note 8, *Paragraph* 10.—*Contagious or not?*—Chomel stated that not one in a hundred of the profession in Paris believes that typhoid fever is a communicable disease. According to Sir Thomas Watson, most of the anti-contagionists in England belonged to that party which advocates liberal opinion in politics and religion; and, he adds, if this should prove to be generally true, it must be regarded as a curious psychological fact. Dr. Copland writes that although specific enteric fever is undoubtedly infectious in circumstances favoring the accumulation or concentration of emanations from the sick, it is not infectious by contact or contagion. Trousseau, on the other hand, gives several instances of its propagation by contact.

Note 9, *Paragraph* 11.—*Duration.*—It is seldom, except in very malignant forms of continued fever, that death takes place so early as the fourth day of attack. Of 42 fatal cases treated by Chomel, one alone was fatal in that period; 9 died between the eighth and fifteenth days, and the remaining 32 all in the third period or week of the disease. He observed that few diseases are so fatal as typhoid fever, that of 147 cases in the wards of the Hôtel Dieu between 1828 and 1832 forty-seven died, or one in three. No doubt only the severe cases were at that time admitted for clinical purposes into the wards of that institution, but it is stated that in La Charité the rate of mortality was even greater. According to M. Louis the rate of death of gastro-enterite was one in three. M. Chomel also alludes to the varying rates of death according to season and to the system of treatment followed. Of 68 favorable cases recorded by Chomel convalescence began on the following days, namely, 1 on the eighth day from attack, 1 on the ninth, 4 on the twelfth, 3 from the twelfth to fourteenth, 10 from the fifteenth to the sixteenth, 15 from the seventeenth to twentieth, 14 from twenty-first to twenty-fifth, and 8 from the thirty-first to the fortieth. The result of these figures is that in 50 cases out of 68, that is, nearly in 3 out of 4, improvement began from the fifteenth to the thirtieth day. The facts do not, however, bear out theories with regard to critical days.

Note 10, *Paragraph* 12.—*Diagnosis.*—Chomel considered that the *diagnosis* of typhoid fever was sometimes extremely difficult; that the symptoms differ little at first from the primary fever of many eruptive diseases, as small-pox, scarlatina, measles, of some catarrhal affections in latent visceral inflammations. Whenever febrile symptoms which cannot be referred to any appreciable lesion, last eight or ten days, there are strong grounds to presume that the glands of Peyer are diseased; and when, on the other hand, a febrile disease of the nature of which we are doubtful terminates in a few days, it is not this affection. From the sixth to the twelfth day symptoms which clear up the diagnosis generally appear, such as meteorism, typhoid eruption, stupor, epistaxis, hæmorrhage from the bowels. During the third period of the disease there is less difficulty, for even if the symptoms during the first two periods be absent all doubt becomes removed by the presence of intestinal hæmorrhages, sloughing, involuntary evacuations and other marks of adynamia. *Enteritis* may be distinguished from it by the fever being less, the evacuations more numerous and painful, and the diarrhœa lasting during the whole disease; in some cases of the fever diarrhœa in whole disease was absent. In enteritis also the prostration is less, stupor, delirium, involuntary evacuations, eruption, meteorism and sloughing rare. The *visceral inflammation* of old persons speedily assumes an adynamic character, but the age of the patients prevents suspicion of typhoid fever. *Phlebitis* and *partially retained placenta* in puerperal women may simulate it, but the local causes prevent the error.

When a disease is prolonged to the fifteenth day and the only symptoms have been loss of appetite, malaise, greater or less fever, some liquid stools without any marked change in the muscular contractility, we must regard it as typhoid fever; no other disease follows a similar course. From the fifteenth to the twentieth day, or later, some well marked symptoms may occur, and if death has accidentally taken place, the characteristic lesions have been discovered. The progress of the disease, more than actual symptoms, distinguishes some ataxic cases from cerebral inflammation. According to Dr. Copland, enteric fever may be mistaken for true typhus, or for common continued fever (synochoid) with enteric complication; there may be little difference observable between them during life, except as regards the eruption; but after death, the alterations in the spleen, cæcum, aggregate glands of the ileum, solitary glands, mesenteric glands, &c., will generally determine the form of fever.

Note 11, *Paragraph* 13.—*Post-mortem appearances.*—Chomel divides the lesions found in fatal cases of enteric fever into the *constant* and the *accidental.* Among the former he enumerates distension of the intestines by gas; transparency of their walls; opaque spots along the curvature of the small bowel, corresponding to Peyer's glands; prominence of isolated glands. The larger patches are found in the ileum and jejunum; when but few exist they are immediately above the ileo-cælic valve; they are rarely found above the upper third of the ileum. The mesenteric gland nearest the patches enlarged and deepened in color. According to him, an acute disease arising in a person in perfect health and ending fatally in a few days in which ulcers are found, would be an exception; all in which ulcers are found had lasted eighteen days. Perforation occurs from ulceration or mortification of the peritoneal coat; around the aperture are found adhesions or purulent matter. He considers that cicatrisation of typhoid ulcers leaves no trace. He observes that sanguineous infiltration of the mucus membrane and of the intestines may be confounded with simple redness; in such cases blood may be squeezed out; this state varies from four inches to two or three feet. It was found in 7 out of 42 cases; of those 2 had suffered from intestinal hæmorrhage, a third had vomited blood, in 2 others blood was found in the small intestines. Sir Thomas Watson describes thus the changes which Peyer's glands undergo in continued fever. They become enlarged and more perceptible than in the normal state; they then present a greyish transparent surface dotted with black points, which black points are the excretory mouths of the several follicles. (They are now considered to be the absorbent mouths). The patch becomes reddish; the follicles burst or ulcerate, or slough away, not altogether, but piecemeal, so that an irregular ragged ulcer is generally left, having thickened edges. Sometimes the patch puffs up into a sort of fungous swelling in which all trace of follicular structure is lost. The color of the ulcerated surface is various, as well as its form and appearance; sometimes it is pale and grey, sometimes red, often yellow or as if stained by the ochry contents of the intestine. These changes are more numerous and extensive in proportion as we approach the cæcum; but the solitary glands usually participate also in the changes, ulceration beginning at the summit and extending deep, although of small diameter. In children the solitary glands have, it is said, a greater tendency to be attacked than in adults; hence the comparative rarity among them of extensive ulceration or perforation. In enteric fever the duodenum is generally healthy; its mucous follicles occasionally enlarged, but ulceration is rare. The jejunum and upper part of the ileum present few lesions, and rarely any different from those observed in other continued fevers. It is considered that few of the marked changes said to be characteristic of typhoid fever take place earlier than the seventh day of the disease. Again, we read that in their second stage the margin of enteric ulcers consists of a fringe of mucous membrane detached from the sub-mucous tissue, not thickened or indurated like tubercular ulcers. They are situated opposite the attachment of the mesentery; when healing they become covered with a layer of lymph, the fringe of mucous membrane becoming attached to the subjacent tissue; the resulting cicatrix is slightly depressed, firmer, smoother, and less vascular than the surrounding mucous membrane, the cicatrised part appearing thinner than those around it. Next to the intestinal follicles the spleen is most frequently diseased. In 10 cases out of 40 recorded by Chomel it was softened and enlarged. Louis observed the liver softened in about half his cases. The blood in the heart is often deficient in fibrine, the air vessels in some instances containing gas, the blood in such being decomposed. Petechiæ and ecchymosis had in such cases been observed before death. Although during life the functions of the brain are disturbed, yet it suffers the fewest appreciable organic changes. In 38 cases there was venous injection of the meninges in 4; œdema of the meninges in 7; general but slight softening in 6; serous effusion in the ventricles, from a tea-spoonful to a dessert-spoonful in 12; bloody points in 5; increased density in 2; a healthy state in 15.

In other Diseases.—According to Dr. Copland, in *dysentery* the small intestines are occasionally inflamed or ulcerated in their lower parts; the mucous follicles or glands, both solitary and aggregated, are often ulcerated; the mesenteric glands often inflamed and enlarged; the spleen enlarged and softened; the liver congested, inflamed or suppurated; the stomach and duodenum congested. He believes that these changes take place in other fevers than specific typhoid, when they lapse into a putrid or *typhoid* state, whether they be gastric, mucous, synochoid, &c. The occurrence of similar lesions is also known in hectic fever. This author observes that a dangerous and most common complication of fever generally is predominant affection of the mucous surface, particularly of the lower part of the ileum and cæcum. Such

lesions are most frequently met with in dysenteric typhoid, or typho-enteric forms of the disease in ill-fed persons, in those using unwholesome water, in low malarious situations, and in particular states of the epidemic constitution. Sir Thomas Watson, writing in 1838, observed that the inflammatory condition of the mucous follicles of the intestines, at that time described by some writers as constituting the *essence* of continued fever, was not constant in that form of fever. He had seen scores of cases in which it was absent; in some localities and epidemics, ulceration of the inner surface of the intestines is less common than in others; it was comparatively rare in an epidemic, part of which he had witnessed in Edinburgh; for several years afterwards in London, he never saw a body opened after death by continued fever without finding ulcers in the bowels, but in the epidemic which raged while he wrote, he had looked for them in many cases that had proved fatal in the Middlesex Hospital, but discovered neither ulceration nor other apparent change in the follicles of the intestine. Chomel, during five years' investigation of this matter in the Hôtel Dieu never met with an exception to the general rule of their occurrence; Andral, on the contrary, met with some few cases of this nature in which this morbid state was absent. According to Chomel, the greater number of patients who died by cholera in Paris in 1832 the follicles of the intestines were enlarged, the elevation about a fourth or fifth of a line, darker than the surrounding parts, white or red, or dark brown in color. They differed from those of typhoid fever in being much less elevated, and in their uniformity at all stages of the disease; there was no difference although some of the patients had died in twenty-four hours after the seizure, and others after thirty-six days. Ulcerations were never found. Both kinds of follicles were enlarged.

In most subjects who die by phthisis the isolated follicles are increased in size and filled with firm whitish matter, while others are ulcerated. In enteric fever, however, Peyer's patches present on their surface a smaller number of isolated tubercles, a greater or smaller number of them being ulcerated. In scarlatina the follicles are enlarged as in cholera.

Note 12, *Paragraph* 14.—*Treatment.*—In 1834 M. Chomel recommended what he called the rational mode of treatment, in which the disease is treated according to symptoms present, and not according to any uniform plan. The antiphlogistic, the antiseptic, the tonic plans were not individually adhered to in every case, but are, he said, to be applied according to the form which the fever may assume. In the *simple uncomplicated* forms he prescribed refreshing drinks, such as lemonade, solution of syrup of currants, emollient fomentaions or poultices to the abdomen if it was painful, sponging the body with vinegar and water, simple baths, mucilaginous lavements, cold to the head, or sinapisms if drowsiness came on. He took some blood from the arm, agreeing with M. Louis that this had a favorable influence on the duration of the disease. In cases of severe headache or abdominal pain, leeches were applied accordingly. If evacuations were scanty mild laxatives, as tamarind whey, neutral salts, &c., were given; if diarrhœa was present, mucilaginous drinks and lavements of starch. Free air, cleanliness, and removal of excretions are insisted upon. When convalescence begins, aromatics, gentle bitters, improved diet, vegetable jellies, weak broths of veal or chicken,—" le lait de poule," wine and water, &c. He modified his treatment according to the urgency and nature of symptoms. In the adynamic form of the disease he recommended preparations of extract of bark by the mouth and in lavements in preference to quinine, if the stomach will bear it, as he doubted whether the sulphate of quinine contains all the tonic powers of bark usually with its febrifuge and antiperiodic principles. In reference to the presence of intestinal ulcers, he observed that they are analogous to cutaneous ulcers in similar subjects, which are improved by stimulating applications. He gives a number of statements in support of treatment of typhoid fever by chlorates, a method adopted in 1827 by Dr. R. Reid of Dublin, and subsequently in 1832 by Drs. Graves and Stokes. The chlorate of soda was the preparation most used. Dr. Stokes prescribed it in doses of fifteen to twenty drops in an ounce of water every four hours, but statistics with regard to its success are not given. Sir Thomas Watson observes that when fever is once established, our object must be to conduct it to a favorable close, to obviate the tendency to death. He adds, upon this point I agree most entirely with Pitcairn, who, being asked what he thought of a certain treaties on fevers, declared, I do not like *fever curers*; you may *guide* a fever, you cannot *cure* it. With regard to emetics and cold effusion in England, he observed that they had gone much out of fashion in the treatment of low fevers; that neither reason nor experience encourages us to look for good results from such measures; that cold effusion was most adapted to the inflammatory types, least so to the typhoid. Dr. Copland observes that in cases of determination to internal viscera except of the head, the use of external refrigerents is more than hazardous. In cases where cæcal pain increases on pressure, leeches may be applied at the same time that wine is given; there is nothing inconsistent in such mixed practice. Sir Thomas Watson recommends *hydrargyrum cum creta* in cases where added to diarrhœa, there is prostration; he would administer it with or without Dover's powder, or with extract of poppies. In cases where typhoid symptoms set in early, he gives beef tea, ammonia, Hoffman's ether and wine, at the same time omitting the mercury. Dr. Twining, with regard to endemic fever of India, recommended tranquility in the recumbent position, barley water or thin gruel, farinacious food, and small quantities of wine. His directions with regard to dysentery were to give only such articles of food as are capable of being absorbed in the upper part of the small intestine. According to Sir William Gull, the great remedy for the delirium of typhoid fever is alcohol. How it acts is not known, but it allays irritation and soothes the nervous system.

According to Trousseau, generous wines, cinchona, camphor, acetate and carbonate of ammonia are appropriate remedies; of the wines Malaga is the best. He recommends as tisanes lemonade and sodawater. He approves of the employment of mustard baths. Dr. Little says that animal broths and jellies should be rigidly excluded from diet; that milk must be the chief article; he recommends curds, rice and milk, blanc mange, tea or coffee and milk. *Meteorism* or tympanitis is often relieved by the application of a blister to the abdomen. In the state of stupor in which a person lies, personal examination of the bladder is necessary, and, it may be, the periodical removal of accumulated urine. The under surface of the patient should be looked at once or twice a day, scrupulous cleanliness maintained; the projecting parts spunged with stimulating lotion and protected by pads or air pillows. When perforation of the bowel takes place, opiates to relieve suffering and check the peristaltic motion of the bowels may be administered.

Note 13, *Paragraph* 17.—*Causes.*—In 1822 Dr. Dix reported the occurrence of typhoid fever, but unattended by cutaneous spots at Rosia in Gibraltar, from the presence of a foul drain close to the door of a dwelling. In 1834 Chomel looked upon typhoid fever as the result of a variety of causes. Out of 116 cases the attack in 5 was attributed to a chill while the person was heated; in 6 to bad or deficient food; in 4 to mental depression; in 5 to debility from other diseases; in 3 to the action of purgative medicines taken for other affections; in 1 to excess of drink; in 5 to excessive fatigue; in 2 to violent physical shock; in 1 to exposure to the sun; in 5 exposure to circumstances favorable to contagion; in 79 no cause could be assigned. From these figures, and for the purposes of this report, it is safe to assume that in the larger number of the cases recorded the disease was induced by non-specific influences. At Corfu in 1861, according to Surgeon-General F. W. Innes, it was due as an epidemic to defective sanitary arrangements superadded to *miasmatic* influences. In 1875 the occurrence of the disease in the Royal Marines at Fort Cumberland near Portsmouth was induced by exposure of the men to emanations from a sewer. In 1877 the outbreak at Croydon was by Dr. Buchanan traced to contamination by sewage matter of the water-supply. In some parts of Essex the farmers manure their land with sprats; the stench from the decomposing fish is horrible, but no disease results. In China, gardens and fields are rendered fertile by means of night soil; the odors from the material are extremely offensive, but no injury to health is traced to this cause. Some severe bodily injuries, as fractures, at times give rise to constitutional symptoms precisely like the most prominent forms of typhoid fever. In Connecticut, fatigue and exposure are said to be almost always followed by an attack of typhoid. In 1873 the outbreak of the disease on board H. M.'s *Doris* and *Narcissus* was attributed to water contaminated by sewage. In Maryland putrid water is looked upon as a fertile source of typhoid fever, while at Vigo it is believed that by custom, people there who make use of foul water have obtained an immunity from the disease.

De novo Theory.—Dr. Murchison considers that enteric fever arises from a specific poison contained in and transmitted by means of sewer emanations. He says, moreover, that fever caused by emanations from foul drains is always enteric fever. It is asserted that typhoid fever may be *generated* from habitual drinking of water contaminated by sewage, or from gaseous emanations from sewers; also that milk readily absorbs such emanations, and conveys the disease.

Note 14, *Paragraph* 18.—*Malaria.*—Dr. Maclean, while at Hyderabad in the Deccan, used during the autumn months to receive into the Residency Hospital a number of cases of remittent fever from the malarial quarters of that densely-peopled city, presenting from the first signs of great depression; the fever, after the second or third exacerbation, becoming almost continued, the skin yellowish and covered with *petechiæ*, the pulse small, exceeding 120, the tongue dry and black, the teeth covered with sordes, respiration quick and irregular, abdomen distended, the bowels loose, a disposition to hæmorrhage from the nose, mouth and bowels, almost invariably delirium with a tendency to coma. Such cases, unless energetically treated, hastened rapidly to a fatal termination by exhaustion and coma. In England, some medical men ascribe continued fever to *malaria*, and on this account consider the ground-floor of houses more unwholesome to reside in than the upper. Trousseau mentions the circumstance that in districts of France where marsh fevers are endemic, and in persons who have not been long absent from such localities, *dothen-enterite* begins by showing the intermittent type; also that typhoid fever in epidemic form occurred on three different occasions in the commune of Chapelle Baton, Deux Sevrès, and upon each occasion after cutting down a wood upon the outskirts of which the farm-house of Haut Verger in which the disease occurred is situated. In America, typhoid fever prevails along river-courses and river-marshes, also in marshy districts. In 1876 Drs. Maclean and Macpherson called attention to "Italian typhoid." The latter gentleman observes that the disease so called was prevalent at Naples, but it was more prevalent in that city in the days when water-closets were unknown than it is now, and Dr. Maclean doubts whether many of the cases are not complicated with *malarious* poisoning.

With regard to *malaria*, we recognise the influence so called by its effects, but in regard to the precise nature and mode of action our knowledge is not yet perfect. According to some writers *malaria* consists of minute organic spores in the atmosphere; others consider it to be gaseous emanations from particular kinds of soil and rock; some look upon it as a result of deficient ozone in the atmosphere; and others as a superabundance of that agent. By some writers it is attributed to decomposition of vegetable or animal matters; by others to heat and

moisture; while at least one would have us believe that the effects usually attributed to *malaria* are nothing more than the results of chills. Each theory is supported to a certain extent by observation and theory, but every theory in its turn fails to account for phenomena recognised as of malarious origin, while those phenomena themselves are so various in their nature as to be at times with difficulty assigned to one and the same original cause.

Some of the more ordinary effects occur in the forms of intermittent and remittent types of fever, endemic in particular localities, but not prevailing as epidemics. Under other circumstances they take the more severe forms of yellow fever or cholera, the one confined within definite bounds of latitude, but there advancing and increasing until a climax has been reached, and then diminishing in intensity until it disappears; the other, unconfined apparently by latitude, sometimes in its phenomena simulating a stage of yellow fever, sometimes the collapse of intermittent fever, but acquiring the property of self-propagation. Dysentery, with or without disease of the liver, is result of malarious poisoning, the disease being capable of propagating itself by means of excretions and probably emanations from those affected by it. Various forms of rheumatism and neuralgia are attributable to the same influence. Besides these, we find anæmia generally appearing after repeated attacks of intermittent fever, enlargement of the spleen, dropsy, vertigo, albuminuria, constant sickness and faintness, and even external ulcers, sometimes of great severity. Mental functions, like the physical, suffer by long residence in malarious localities, depression, excitability of temper, capriciousness, loss of memory, and so on, being among the common effects.

All persons are not alike subject to the effects of malaria. Foreigners are, as a rule, more so than the inhabitants of the countries in which the cause exists. This is, however, not without exception, for often in the case of cholera, and occasionally iu that of yellow fever, aborigines and foreigners, the newly-arrived, and the old resident alike are liable to attack. Neither is man alone liable to suffer from the effects of this influence, whatever it be. To say nothing of epidemics of various kinds which have from time to time in the world's history prevailed among animals and among the human race, it is a circumstance well known that dogs, horses, and other domestic animals imported into malarious countries suffer from intermittent fever to an extent little, if at all, less than man; and not only they, but birds. I had in Calcutta as a pet an extremely interesting specimen of the sulphur-crested cockatoo, the *Psittacus galeritus*, which suffered from intermittent fever, as I did myself, and, like me, recovered on coming to England; but the records of epidemics abound in such instauces.

The principal sources of *malaria* are said to be tropical swamps. Some such districts, particularly Bulam, give their name to the prevailing type of fever, while it is customary to assign to cholera the Sundubunds as its home. These and others are, however, not equally "malarious" at all times or seasons, nor are all swamps necessarily malarious. In 1837-38 the French troops in Algeria were encamped on the bank of the Khumis, a river liable to flood and overflow, and so severe did sickness and mortality soon become that the position had quickly to be abandoned. Similar losses occurred at Boufarik, in the same colony, in 1830, and again in 1835. In the latter year a camp was formed on a marsh, and the site for a town laid out; the result was that entire battalions were lost to the army, and the first inhabitants almost entirely swept away, yet by perseverance the swamp has since given place to gardens, boulevards, a flourishing town, and at the present time is considered to be one of the healthiest spots in Algeria. The Bulam river and the Rio Grande, both on the West Coast of Africa, generally so fatal to boats' crews in the old days of slave expeditions, were under other conditions productive of no evil results. On the other hand, all marshes are not productive of malaria, thus peat-bogs, some salt-water marshes, and some swamps in New Zealand and America enjoy this immunity. In the case of marshes liable to be alternately submerged and left uncovered, *malaria* is chiefly to be dreaded under the former condition, and a regular marsh is in reality less dangerous than one that is imperfectly drained. In order to render a malarious marsh healthy, the drainage to be effectual must be deep. Unless it be so, the evil it was intended to diminish may really increase. Malarial diseases are less to be dreaded after a succession of heavy falls of rain separated by intervals of clear weather than by a continuously moist state of the atmosphere. The interval between exposure to "malaria" and the manifestation of its effects varies according to circumstances. Those effects may take place very rapidly, and after slight exposure—that is, after an interval of half an hour, and instances are recorded of laborers in France and Italy dying almost instantly from merely sitting down or lying upon the ground; under the generality of circumstances however a week elapses between the reception of malarious poison and the production of its effects.

But although no *malaria* may manifest itself so long as the surface soil is intact, there are many undoubted circumstances which prove that this influence is disengaged by the process of turning up new soil, whether for purposes of agriculture, or clearing sites for camps or buildings. This was found to be the case in Algeria, China and India, and must always be a source of danger to "pioneers of civilisation" in countries having a high temperature. Cultivation renders such localities healthy, although this has certain limitations, as in the case of rice, but in order that it may do so, the culture of the land must be deep. This was practically discovered to be necessary in Algeria, hence, to produce similar effects in India, something more than mere superficial scratching of the soil, such as is at present prescribed by cultivators, is necessary. It is easy

to understand that soil saturated with decomposing organic matters may liberate pernicious influences when newly turned up, and it is well known that not only fevers but cholera has been caused in this way; what, however, is intended to be inculcated, is that localities previously healthy have become the reverse by the process of turning up the soil.

Malaria, so far from being limited to marshy districts, may, under certain circumstances, prevail in localities of the very opposite character. In 1794 our forces in South Holland, after a dry and hot summer, suffered severely from fever, yet the locality consisted of a sandy plain with a dry surface, covered only by a few stunted heath plants. On digging, however, water was invariably found at a very small distance from the surface. At Baiæ a French army of 28,000 men was reduced by malaria in a few days to 4,000, the soil consisting of alluvium upon magnesian limestone, but with water existing at an inconsiderable depth. In the Punjaub, where white troops occupied Wuzzeerabad in 1850 to 1853, remittent, continued of a low type, and intermittent fevers of great severity prevailed among them. The locality presented a dry sandy surface, over which only grew some plants of *Asclepias gigantea* and of *Artemesia*, but underneath a few feet of alluvium the soil was percolated by water. It is known that dry beds of the larger rivers in India and elsewhere are similarly "malarious."

Malaria may occur upon soil consisting of the detritus of rocks, and upon rocks themselves, where at first sight no apparent source of this influence is apparent. Gibraltar, Ascension, the Ionian Islands, and some of those of coral formation in the West Indies, have been visited by severe epidemics of malarious fevers. Several rocky positions in Southern India have similarly been visited, as, for example, Gootee Droog, in the Bellary District, which, although of a height above the surrounding plain of 300 to 400 feet, and of igneous formation, had to be abandoned by troops on account of the extent to which fever prevailed there. Humboldt describes the station at the great falls of the Orinoco as devastated by fever, and attributes the circumstance to the great difference which exists between the temperature of the rock and of the atmosphere, the former being 118° F., and the latter 78° F. It is further stated that the rocks, becoming split and disintegrated by variations in the temperature, decomposing matters percolate into the crevices so formed, and thus produce "malaria." The presence of volcanic rocks is considered to favor malaria, the sulphur contained in them being said, although perhaps upon insufficient grounds, to be the immediate cause of the evil.

Montgomery Martin in describing the soil of the coast from Cape Palmas to the Volta, observes that "the clumps of hills which are to be met with in every direction are composed principally of gneiss and granite; mica slate is found to enter into the composition of some at no great distance from Cape Coast Castle. These rocks, from containing lare proportions of felspar and mica, are rapidly passing into decomposition, more especially such as are exposed to the influence of air and water; the result of the decomposition is the formation of a clayey or argillaceous soil." A remarkable similarity having been observed between the characters of the fever which prevails here and at Hong Kong, and a possible connection between the type of disease and the geological formation of a country being believed to exist, we turn to the account given by the same author of that island. Its structure "may be described as consisting of decomposed coarse granite intermixed with strata of red disintegrating sandstone, crumbling into a stiff ferruginous-looking clay. Gneiss and felspar are found in fragments. That the granite is rotten, and passing, like dead animal and vegetable matter, into a putrescent state, is evinced from the crumbling of the apparently solid rock beneath the touch, and from the noxious vapor, carbonic acid gas, or nitrogen it yields when the sun strikes forcibly upon it after rain." "The strata," he adds, "appear like a richly-prepared compost, emitting a fetid odor of the most sickening nature, and which at night must prove a deadly poison. This stratum quickly absorbs any quantity of rain, which it returns to the surface in the nature of a pestiferous gas—a description, it may be added, which is equally and with perhaps more force, applicable to Cape Coast than to the place in respect to which it was written."

There is no good reason to adduce against the theory enunciated by several medical men, besides Dr. Heyne, that the type of disease is modified by the physical characters of localities in a way similar to the flora and the fauna of such places; and others besides him have observed that which he has enunciated, namely, that "the ordinarily received opinion as to the vegetable or marshy origin of fevers will not hold." He speaks of the south of India; but the remark is applicable in a particular manner to the Gold Coast of Africa, where, although marshes are few and far between, the so-called "fever" is fatal to a degree probably beyond what occurs in any other part of the world, and he reasons thus: "Now, if it should be found that fever exists constantly and invariably among certain descriptions of hills, while others of a different composition are as constantly free from the same, would it not become reasonable to suppose that the nature or composition of the rock itself must furnish the cause of the calamity?" With reference to Southern India, he goes on to say that the hills where *malarious* fever is found to prevail appear at first sight to be quite harmless, as they are of granite, which is the most common kind of rock on the face of the globe. They contain, however, quartz, besides felspar and mica, a great proportion of ferruginous hornblende, which, by its disintegration or separation from the rock, becomes highly magnetic, and in which, he adds, "I suppose the cause resides which produces this fever, besides a great train of other disorders." On the other

hand, according to this authority, the hills in Southern India on which the peculiar fever is unknown are of primitive trap, which consists of quartz, felspar, and real hornblende. These remarks have a special reference to the physical conditions of Bangalore, Bellary and Secunderabad, in connection with the subject of fevers occurring at each of those places as detailed in the text of this report. American writers observe that encampments on land, the wood of which had just been cut down are, of all others, the most unhealthy, and adds, " it is perhaps from this cause that new countries are generally fatal to the first settlers." Thus it appears to me we have, in the conditions here enumerated, important evidence in regard to endemic influences in India and in other tropical countries. Dr. Cleghorn, writing of the forests of Southern India, makes somewhat similar allusion to the influence of woods upon health, and expresses his belief that the greater degree of sickness at Wellington than at Coonoor, although only a couple of miles distant, is attributable to the scarcity of wood at the former place as compared with the latter. It seems almost needless to observe, that in order that woods and forests may prove beneficial as guards against malaria, it is necessary that they are composed of trees which are themselves in a healthy state, and are not of the description known to produce injurious emanations.

Note 15, *Paragraph* 19.—*Allusions to Enteric Fever in India.*—The hakeems or native physicians, recognising the close alliance existing between fever and dysentery, assign both affections to similar causes, namely, high temperature, humidity, exposure to changes of weather, fatigue and privation. In 1828 Dr. Twining, alluding to the liability of new arrivals in India to be attacked by continued fever, made the remark that the heat of the body was almost always uniform, and above the natural standard; that the usual causes of fever were exposure to the sun, violent exertion in the hot season, bathing while in a heated condition, and the use of spirits. While I write these notes the fashion of the day is for young men, especially officers, to indulge to a great extent in what they call *athletic* exercises, and often with the result indicated by that Indian physician, they are struck by fever, or by liver disease. According to Johnson and Martin, fevers of the same place are not of the same type in all years; consequently they require modifications of treatment; almost all the complications of the Bengal fever are abdominal, whether they be inflammatory, congestive or merely irritative. According to Dr. Geddes, abdominal inflammation existed in one case in 61 of general admissions into hospital; diarrhœa in some cases of fever was caused by prolonged effects of an emetic, and in other cases, diarrhœa or dysentery were accompaniments of fever; also, in certain cases of violent remittent, the symptoms occasionally put on a *typhoid* appearance, and in some, the disease assumed the chief features of a continued fever. Some writers consider *febricula* or ephemeral fever is in reality an intermittent fever, limited to one paroxysm. Dr. Cullen believes that true typhus occurs in India, and that he himself saw a case of this form of fever in the 3rd Brigade of Artillery at Agra. Sir R. Martin observed that Indian endemic fever varied in different persons and at different times. There are 1st, a fever with great vascular action, with determination to some internal organ; 2nd, a fever recurring at longer intervals from the application of the cause, showing greater arrangement of the balance of excitability than of the circulation, infectious; 3rd, with high vascular action, considerable determination to the head, stomach or alimentary canal; 4th, a slow nervous fever degenerating into the typhoid form of the second example; 5th, with great remissions or intermissions on alternate days; 6th, great violence of action at first, with little or no remission, sudden determination to an internal organ, or changing to a tedious and dangerous *typhoid* type. With regard to the remittent fever of Bengal, he observes that in its adynamic or malignant form it constitutes *pucka* or jungle fever. Occasionally the vascular excitement may at first nearly approach that of the inflammatory forms; in others the vascular action is low and imperfect, the abdomen tumid and hot, the extremities cold. According to Dr. Copland, amongst the earliest complications of remittents is inflammation of the mucous surface of the stomach and duodenum; this condition is indicated by irritability of the stomach, fullness, heat and tenderness of the epigastrium. This pathological state often extends to the small intestine, and even to the larger bowel, as indicated by tumefaction of the abdomen, diarrhœa or dysenteric symptoms. Remittents thus associated, often pass into or terminate in dysentery. He also alludes to the difference which exists between the adynamic state of marsh remittent, and those of bilio-inflammatory or ardent fever of hot countries. In the former the exacerbations seldom continue above fourteen or eighteen hours, and usually present a quotidian or double tertian type; in the latter, called slow *seasoning fever*, the type is continued or a remission does not occur until after thirty or thirty-six hours, a different train of symptoms then appearing. The remittent always proceeds from malaria in some form; ardent fever is more especially the effect of temperature, or of atmospheric vicissitudes and malaria acting together.

Writing of synocha or inflammatory fever, the same author observes that in its milder form the phenomena are usually exasperated in the evening; their mitigation in the morning attended by partial perspiration. The severe or ardent fever called also *climatic* or *seasoning* fever occurs among the recently arrived in warm climates, and more especially among the young, the intemperate, the robust and plethoric, and among those exposed to the sun in very high temperatures. Its attack is usually sudden. Synochus biliosa, gastric, bilious, continued or endemic fever at times occurs in epidemic form. It is very prevalent in India, and in other hot countries, being induced by *malaria*, exposure to the sun, intemperance and

fatigue. Drs. Denmark and Boyd believe that in its severest form it may become infectious. This form of fever, at first continued, remits on the morning of the third to the fifth day, the symptoms becoming exasperated towards evening; pain occurs in the epigastrium; there is vomiting; generally diarrhœa, the evacuations sometimes containing blood or becoming dysenteric. Various adynamic malignant symptoms may appear about the fifth to the eighth day. In some instances this form of fever ends in enteritis, dysenteric or abscess of the liver, the lesions being for the most part similar to those found in remittents. It is said to occur only in whites when the temperature is upwards of 88° F. during the day, and 80° F. at night. In it, cold affusion is a valuable remedy, and according to Dr. Stevens, salines should in addition be given internally. Besides the above-named forms of fever seen in India, Dr. Copland describes *simple continued fever* or *synochus mitior,* also *severe* or *complicated continued* fever or *synochus gravior.* In the latter, diarrhœa is generally present; the evacuations at first feculent, fetid and dark, subsequently in unfavorable cases becoming watery and of an ochry hue. Between this form of fever and *asthenic, adynamic, low* or *typhoid* (non-specific) the distinction is, according to Dr. Copland, of degree rather than of character. He remarks that even the milder cases of simple continued fever may assume a *typhoid* or *typho-enteric* character, or even that of *typhus* in an advanced stage, differing however from the former in the enteric alterations, and from the latter in the absence of the proper exanthem; also that although this form and synochoid fevers may become infectious owing to overcrowding, want of due ventilation, and the influence of superadded causes of a noxious character, such as emanations from animal exuviæ, drains, &c., yet they never affect the healthy when these conditions are not present. Moreover, it is well known that all forms of Indian fevers, under certain conditions of person, climate, and locality, become adynamic, low or *typhoid,* whether at their outset their type was intermittent, remittent, or continued; also that in such adynamic state the danger to life is the greater in proportion to the extent of affection of internal organs, whether cerebral or abdominal.

Note 26.—*With regard to Epizootics.*—In connection with this subject, and having reference to what has already been said in regard to endemic morbific influences as affecting animals and plants, it seems to me appropriate to refer to some remarks contained in a work by Mr. Edward Mayhew On the Management of the Dog. In describing distempers in that most faithful companion of man, he observes that in its characters it approaches very near to continued fever in the human subject; the digestive track is the principal seat of the disease; it essentially is fever affecting the entire of the mucous surfaces, but especially those of the alimentary canal; cold, wet, bad food, foul air, excessive exertion, fear, &c., are grouped together as its causes; the symptoms in the very early stage may assume almost any form; the pulse in puppies varies from 110 to 130, and in dogs from 100 to 125; in its later stages the discharge from the nostrils becomes mingled with blood and scabs, and is offensive; diarrhœa sets in; sometimes recovery appears to take place. At the end of two or three weeks the symptoms recur; in some cases ulceration of the cornea takes place; pneumonia not unfrequently occurs; the liver is generally involved; so are the stomach and intestines; the duodenum, jejunum and ileum are inflamed; the rectum reddened; during life blood has exuded from the surface of this bowel to such an extent as to destroy life from hæmorrhage; a pustular eruption is often observed, its position on the abdomen and inner part of the thighs; in bad cases the tongue is coated, red and dry at its tip and edges; the breath is offensive. Mr. Mayhew adds that the disease is of a febrile kind, and has a tendency to assume a *typhoid* character. In the course of his further description, several other symptoms are noted, which more or less closely resemble those of typhoid fever as enumerated in the preceding pages. Whether the same conditions actually exist in man and his friend I do not pretend to say; but it seems to me a matter worthy of the profession, to pay more attention than is at present done to the phenomena of diseases which affect animals during the prevalence of affections believed to be specific among people.

APPENDIX C.

MEMORANDUM ON HEAT APOPLEXY.

I consider that I may appropriately introduce in this place the following remarks by myself issued in June 1877, for the guidance of medical officers doing duty under my superintendence, namely :—

" The commencement of the hot season appears to me a fitting occasion to solicit the attention of Army Medical Officers serving in the Madras command to the very important subject of heat apoplexy among British troops under their charge. I accordingly submit, for ready reference by them, an abstract of remarks on the subject of this affection published* some years ago, bearing in mind while so doing that in matters purely professional individual views are to be respected, yet that, considering the length and varied nature of my service, the results of my experience may have some measure of value.

" According to the article alluded to, the term *Heat Apoplexy* includes, erythismus tropicus, coup de soleil, apoplexy of the hot winds, and sunstroke. These affections are identical, they arise from similar causes, modified by individual conditions. In all, symptoms and post-mortem appearances are alike ; the treatment to be pursued the same. In former years the mortality by the affection was excessive ; we read of only one recovery taking place out of 28 cases, and more recently of 72 deaths in 162 cases. It was considered that its greater prevalence and mortality thereby arose in part from the greater prevalence of spirit-drinking in former times than more recently, aided by the extent to which soldiers were crowded together in barracks, the absence of means of cooling their rooms, and their forced confinement to those rooms without means of occupation or amusement. With recent improvements in all these respects, cases of heat apoplexy among the troops are now comparatively rare.

" In some respects the term *Sunstroke* is a misnomer. In former years the victims of *Heat Apoplexy* were most numerous among soldiers who were compulsorily confined, whether to barracks, to hospital by sickness, or to cells as defaulters. The wives of soldiers, although much within doors, are little liable to the affection, a circumstance no doubt due to the fact that they are occupied with their household duties and thus in conditions different from those of the classes of men here enumerated. So far as my experience is concerned, the wives of officers enjoy complete exemption from this affection. During the field operations of 1857-58 soldiers performed long marches and fought battles in the hottest weather without being necessarily attacked by the disease, so long as they were not under the influence of spirits or malt liquor, and so long as they had ample supply of water for use internally and externally ; by the latter means the functions of the skin were maintained and the temperature of the surface kept moderately low.

" I believe that the majority of attacks of the affection take place in the later part of the afternoon and earlier hours of the night. In either case the actual seizure is most to be dreaded while the individual is asleep, and especially if to a state of exhaustion be added a heavy meal or free libations of " drink." Dry heat, more especially if the atmosphere be in rapid movement, is less productive of attacks than a more moderate temperature with a high ratio of aqueous vapor in, and stagnant condition of the atmosphere. In such conditions not only man, but the lower animals suffer from the affection, and all alike experience a relief when relative conditions culminate in a thunder-storm.

" Instances occur during the hot and rainy season in which difficulty is experienced as to whether particular symptoms in a patient are referable to fever or to heat apoplexy ; others characteristic of the former, on occasions run into the latter. Hence the very great importance of watching conditions under such circumstances, so as to meet them while in their incipient stages. As to the question, is Heat Apoplexy a result of malaria, or of high atmospheric temperature, the point has more a theoretical than a practical application.

" The manner in which an attack by heat apoplexy occurs varies. In a considerable number of cases the subject of attack passes gradually from a state of sleep into that of unconsciousness by the disease, his stertorous breathing and intense degree of surface temperature, especially at the epigastrium, indicating the actual nature of the case. In other instances the affection supervenes upon an attack of fever. In a third class the approach of the attack is indicated by vacancy of expression, flushed face, and unusual behavior on the part of the patient. In a further, the person about to be attacked is the first to remark his own condition ; he experiences a sense of weakness in, and loss of power over the lower limbs, involuntary micturition, cerebral fulness, giddiness, and confusion of ideas. A douche applied early will often check the further advance of the latter symptoms.

" In treating cases of heat apoplexy the most effectual method, according to my experience, includes the following measures, viz. : 1, Free affusion over the whole body, but more especially over the head and epigastrium ; 2, Free abstraction of blood from the temporal arteries, the patient being meantime retained in the horizontal position ; 3, Internal counter-irritation, as by the administration of croton oil ; and 4, External counter-irritation by sudden vesication of the nape of neck, sinapisms to the calves of the legs, &c.

* *Experiences of an Army Surgeon in India.* By C. A. Gordon, M.D., C.B., Baillière, Tindall, and Cox : London.

"Let us take a typical case: a patient when first seen presents the indications of confirmed heat apoplexy. He is placed on a bedstead outside the ward, and freely soused with water poured upon him from a height, if possible by two persons at the same time, the principal streams directed upon the head and epigastrium, care being of course taken to guard against suffocation. If although unconscious, he is able to swallow water, some, cold or iced, should be put to his lips or into his mouth. He is next turned upon his face and affusion applied along the spine; friction to his legs being made by attendants. In the meantime, if able to swallow, three or four drops of croton oil are given; if unable, an equal quantity or more on a piece of sugar is placed in his mouth, while he lies upon his back, in view to some portion finding its way into the stomach and producing either vomiting or free catharsis. Note that we write here of confirmed cases, not the slighter forms of attack often called sunstroke by misnomer. One or both temporal arteries are opened and allowed to bleed while the affusion and frictions are continued; nor need risk be feared, as the bleeding, even when not checked artificially, will speedily cease. It is important to observe, however, that during this time the patient is to be in the horizontal position, and that he be not placed in a sitting posture; in the latter, fatal syncope may suddenly take place. When these remedies fail to produce speedy effect, sinapisms are applied to the legs or vesication of the nape produced by the application of a hot spatula.

"These are energetic remedies, and to be successful they must be energetically employed. We no more can expect success in recovering a soldier from an attack of heat apoplexy by treatment employed only for a short time and in an undecided manner, than we can expect by means of mild remedies to recover a man asphyxiated by being immersed in water. If therefore a medical officer from indifference or apathy fails to personally grapple with a case of heat apoplexy, and leaves his patient to the care of imperfectly instructed attendants or the undirected attentions of native Asiatics, the chances are very many against recovery. Even with a greatest and most constant attention and steadiest perseverance in treatment, heat apoplexy is one of the most dangerous affections that come under the notice of the Army Medical Officer in India. Above all, it is necessary to treat a patient as early as possible in the attack, and to do so according to settled principles."